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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

SEPTEMBER-1941

BUT
THIS ISN'T ONE-TWO-THREE TO WHAT CAN BE DONE WITH THE
HUMAN MIND

Eight hundred miles from Rangoon in Burma there is a race of Mongolian extraction whose taste in feminine beauty runs to giraffe-necked women. The longer a woman's neck, the better her chances of matrimony. So, early in life, the girls start stretching their necks by the use of rings. Periodically, a new ring is added . . . with the result that is shown above.

But this isn't one-two-three to what can be done with the human mind and human spirit. They can be "stretched," expanded, shaped almost at will, given new horizons, and new possibilities of achievement . . . provided only that the influences during a youngster's formative years be right, and the will to win residing in every boy's heart be fed and nourished.

Wise educators know this. They know that the young human mind and spirit are plastic to a degree not ordinarily recognized. There's not a great deal of difference between the talent possessed by one boy and the ability possessed by another. The will to win slumbers in the heart of every mother's son. It's the influences that are brought to bear on these youngsters that spell the *great* difference between achievement and failure in the years to come.

That is why educators who are truly worthy of the name go beyond the routine of "instruction" and seek to surround their students with the influences that fan into flame the spark of achievement. That is why exceptional instructors in mechanical drawing urge the use of fine quality drawing instruments. For, *chosen with care,* these instruments in the act of truly creative work can open up a new realm in the imagination of a youngster. They set a goal, and they show the way in which it is achieved. They initiate a boy into the discipline which is so essential a part of achievement. They train him in sensitive craftsmanship, in higher ideals and aims. They can even stimulate his ambition and lift his ability. Their slightly higher cost, when compared with their value and their use, is as nothing in this important work, the making of a man.

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INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

VOL. 30 SEPTEMBER, 1941 Number 7

THE NEW SCHOOL YEAR

With vacation days coming to a close, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION wishes its many readers Godspeed on their journey through the school year 1941–42.

The added importance which the Defense Training Program has given to both industrial arts and vocational education should cause every shop teacher to be alive to the possibilities of the subject which he teaches. Old objectives must be restudied and revamped, and emphasis redistributed to meet the needs disclosed for both these fields of education, by the exigencies of the momentous times which have come over our country.

FROM WAR-TORN ENGLAND

One of our readers in England, in his subscription-renewal letter, makes the following statement:

" . . . I think it is wonderful that after nearly two years of war, we are still able to work a fairly normal timetable, and that the attendance is particularly good and the spirit of the pupils marvelous."

We rejoice with our brother worker and his students that they were able to adjust themselves to conditions which we can hardly picture.

We hope that they will be able to maintain their fine morale until this sad state of world affairs is over.

THIS MONTH'S COVER

The illustration chosen for the cover of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION for this month shows the machine shop in Room No. 232, at the Lane Technical High School, Chicago, Ill.

Charles E. Lang is the principal, Carl A. Carlson the shop superintendent, of Lane Technical High School, and Wm. Youngstrom is the instructor in the shop shown.

THE NEXT ISSUE

The projects number was so enthusiastically received last year, that it has been decided to devote the next issue to school and home-shop projects.

Do not miss the next number.

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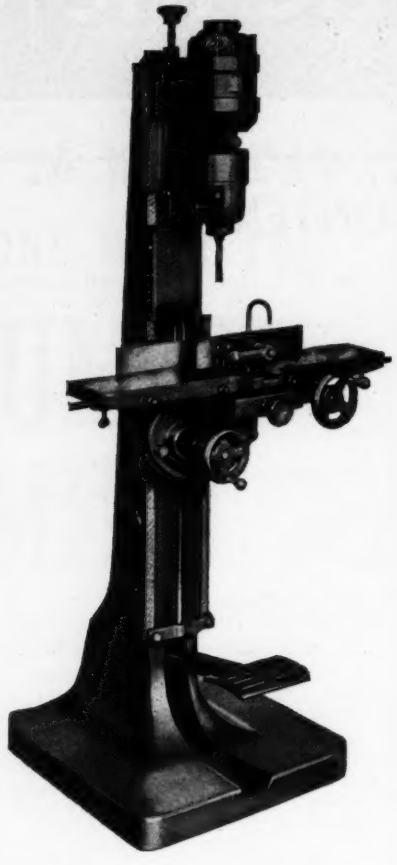

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These machines are, first of all, full size, industrial-type . . . capable of producing most anything the youthful mind can devise. They are, also, easy to operate, enabling the operator to focus his attention on his work instead of on the manipulation of the machine itself. Well constructed, Yates-American equipment withstands the hard usage students sometimes give machines in their enthusiasm to translate their ideas into actual projects.

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Short Talks on Wood

MAGNOLIA (*Magnolia grandiflora*)

The value of magnolia was not fully appreciated by early lumbermen, consequently the tracts which were left standing have flourished and grown large. The wood is moderately heavy and hard, and is of a creamy color with a satiny luster. Is easily worked.

Most of the magnolia lumber of commerce is cut from this species. It is used principally for planing-mill products, furniture, fixtures, venetian blinds, finish, siding, boxes and crates. A good fuel wood.

Grows along the coast from North Carolina to Florida and westward to Texas, and also up the Mississippi to Arkansas. Prefers rich, moist soil. A good ornamental. The combined beauty of its leaves and flowers has earned it a well-deserved place in song and story.

In its natural habitat it attains a height from 60 to 80 feet and a diameter up to 4 feet. The head is broadly pyramidal in shape.

The bark is brownish-gray, rough with short, thin scales. The leaves are evergreen, thick, leathery, from 5 to 8 inches long and 2 to 3 inches wide. Dark green and shiny above, rusty and downy beneath. Have prominent midribs.

Bears large, fragrant, attractive flowers that resemble the water lily. Petals are pure white, waxy and fall one by one. Fruit is a rounded head from 3 to 4 inches long containing many sheaths. These open in fall and release bright red berries which dangle on slender threads.

To date, twenty-seven brief articles similar to the one above and dealing with the more commonly used woods have appeared in these ads. As in the past, we continue to invite your suggestions as to the species of wood you would like featured in this series.

YATES-AMERICAN

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

Implications for Industrial Education of the A.V.A. Study of Vocational Graduates*

ARTHUR B. MAYS†

In an effort to assess the outcomes of vocational education as it is now being provided in the public schools, the Research Committee of the American Vocational Association during 1937–39 made what is considered to be a beginning of such a study. The plan adopted was to make an extensive examination of the occupational adjustment of the graduates of the vocational curriculum of some school system which was generally recognized as outstanding in its program of vocational education. After careful consideration, the school system of Williamsport, Pa., was chosen and a carefully developed plan was made for the study of the vocational graduates of that system during the previous 15 years.

The Research Committee hoped that data would be found which not only would reveal much of importance concerning the effectiveness of the vocational-education program as a means of occupational adjustment of youth, but that constructive suggestions would emerge for the improvement of present procedures. A further purpose of the study was to establish a procedure for many similar studies by other groups in the field throughout the nation. To aid supervisors, teachers, and others in making similar studies in their communities, the forms used by the committee's investigators were revised in the light of experience and printed in large quantities for distribution at cost to vocational teachers and officials throughout the country.

Because of the great care with which this study was made, the results are regarded by the committee as unusually dependable, within the limits of the study, and the implications of the findings as particularly significant for vocational education in the United States. The writer feels that the industrial education section of the study is of considerable importance to those engaged in that field. The classes studied were those of 1922, 1925, 1928, 1931, 1934, and 1937. Of this group 96 per cent gave replies to the investigators who were able to have personal interviews with approximately nine tenths of the group.

It is not possible in a brief magazine article to review all the findings, but the implications of the data seem sufficiently significant to consider in some detail. In the first place, it seems clear that there is no longer justification, if there ever was, for the assumption that most boys who choose industrial courses do so merely to escape what appear to be more difficult courses. Most boys today choose such courses because they think they want to learn the trades represented. American youth in growing numbers are beginning to realize that success in the modern economic world is achieved only by the trained worker. It has taken many years to dissipate the old pioneer theory that character and energy are the only requisites of success. They are still basic, but of themselves utterly inadequate in a scientific and mechanical age. This means that a heavy responsibility rests upon all teachers and administrators of vocational courses to provide training that is fully adequate to the needs of those seeking employment in the vocations practiced in the most complex and exacting occupational system known in history.

Another important implication of the findings of the A.V.A. study is that comprehensive and effective vocational guidance for those looking toward industrial vocations is not only desirable but imperative, if the money spent on industrial education is not to be largely misspent and if years of discontent and inefficient work are to be avoided in the lives of those graduating from industrial courses. While it is evident that there is a large degree of value in any industrial course well taught, the advantage of entering immediately the trade for which one is trained is too marked to justify any complacency concerning the proper selection of courses and placement of graduates. The time will soon come, if it be not already here, when taxpayers can no longer tolerate the training of youth for jobs which do not exist, or for which youth are unsuited. The clearly discernible consequences of placing persons after graduation in trades other than those for which they are trained are far more serious than most educators realize. The economic loss involved is one of the least evils resulting. The proper counseling and placement of trade school pupils is one of the most pressing problems of industrial education. It is high time that something really effective be done with reference to this problem.

Furthermore, it is clear from the A.V.A. study that it is futile to plan programs of vocational-industrial education on any other basis than ascertained community needs. Not only is this evident, but when the program is established as a result of careful study of local needs, it must be designed so as to meet constantly changing conditions. Traditional school procedures have far too long a time governed the administration of industrial education in the public schools. No courses should be established unless there is a clearly evident need for them and they should be discontinued when the need disappears. This is not easy to manage in the traditional school organization, but a way to administer industrial education thus must be found. One clear implication in this situation is the universal need for opportunities for further training after graduation. This means evening classes, short-unit courses in late afternoons, correspondence courses, and any other type of instruction which meets the needs of the person who wants to upgrade himself in his trade or who desires to learn the skills of a job other than the one he

Occupational Adjustment of Vocational School Graduates, American Vocational Association, Denrike Building, Washington, D. C., Research Bulletin No. 1, 1940.

**University of Illinois.

has held but which is unsuited to him or is no longer available.

This last-mentioned need suggests the growing importance of industrial arts as a broad basic training in industrial knowledge and processes. Breadth of training is the essential basis of job versatility. As jobs become more highly specialized and the need for frequent shifting from job to job becomes an increasingly important feature of industrial employment, the sort of broad and varied shop experience afforded by industrial arts plays an ever more significant part in the industrial education. For those destined to work in industry, it is evident, also, that industrial arts is an important factor in vocational guidance. It could be made to play a far more important part than it does if teachers in industrial communities were more keenly aware of its guidance possibilities. Furthermore, it is evident that there should be a far greater degree of cooperation between vocational-industrial education and industrial arts, if the maximal values of both are to be obtained. The pupils seem to be aware of the inherent, close relationship, but teachers need to recognize more clearly the need for effective cooperation between the two areas of industrial education.

Finally, the Williamsport study implies the urgent need for counselors and teachers of trade pupils to keep in close contact with the parents of their pupils. The very great influence on the subsequent career of a youth of the first job after graduation, and the important part played by parents and relatives in securing such jobs makes this need evident. However efficient the counseling and placement activities of the school may become, it is probable that parents will continue to play a major role in the selection of trades and the finding of first jobs. There appears to be every reason to expect great mutual benefit from any wisely managed program of parent-school cooperation in the effort to aid youth in the choice of trades to be studied and in the start on the vocational career.

The A.V.A. study of the Williamsport schools will reward a careful reading by teachers and administrators of industrial education. It should be supplemented by many similar local studies using the same information forms so as to facilitate comparisons. If this is done, within a few years the industrial education forces of the United States will have a body of factual data which will give a stability to the programs and practices based upon the data which few educational fields can match.

Promoting the Vocational High School

R. RANDOLPH KARCH*

Experiences gained in junior high, senior high, vocational high, and post high school educational work, have convinced the writer that there is a great lack of progressive and effective use of promotional work. Usually forgotten until the passage of some bond issue of vital importance, promotion is often "just another job" of some subcommittee of a school. Fortunately, the more aggressive school systems now are beginning to have public relations departments, and this trend is becoming more apparent year after year.

Printing departments and schools are as guilty as are printers of the accusation "they do not use their own reproduction processes to advertise and promote their own professions or businesses." When traveling about the country meeting printers and lithographers, it is apparent that most of them have no idea that different aims and objectives exist for schoolwork on the industrial-arts level, and on the vocational-education level. If these men thoroughly understood the part which the schools play in the training for the placement of youth in industry, the training of apprentices and journeymen already established in industry and in the job that industrial-arts printing does in prevocational and consumer-knowledge work, they would be more ready to back schoolwork and school-bond issues.

The job of the school print shop is one of selling an educational idea.

This job can be done in various ways, and all should be employed:

1. Talks of an informal nature to printers' groups.
2. The establishment of an advisory council.
3. Printed or lithographed literature sent periodically to the trade.
4. Contact with graphic-arts executives at conventions, meetings, and by personal calls.
5. Local and national news and magazine inserts.

Printers' Groups

Organizations receptive to educational needs of workers, apprentices, and pre-apprentices in most cities are the local branches of the Typothetae movement, the 60-odd Craftsmen's clubs, other employers organizations, and in some cases the unions. These men who make up such organizations are usually in the dark as to the work of the schools. They hesitate to contribute attention or cooperation to any great extent to things that they do not understand. To make them understand that the schools are doing a good job, necessitates, in most localities, a promotional campaign — or to put it in plain words a selling job.

Being gregarious, executives, superintendents, and foremen meet and talk about their common problems. One of these is on school taxes, another on how to train employees, how to attract good apprentices, and how to select and train them. Besides these there are many technical and business problems. These men are accustomed to listen to speakers, and are often better listeners than they are readers. A splendid opportunity exists to meet them at their meetings and tell them a straightforward story about the work of any school, be it industrial arts or vocational in intent. A teacher or principal or supervisor need not be concerned if he feels that he is not a good public speaker. These men do not want to be entertained, and are irritated if they find the music good but do not understand the words. The best plan to follow is to conduct the meeting as a round-table discussion. Perhaps a twenty minute talk is all that is necessary to get the questions going. Printers as a group are prone to argue in a gentlemanly manner. This is capital.

The Advisory Council

The advisory council idea in vocational education is not new. It is true, however, that many councils, after their formation, lose interest and become inert. The leadership should be invested in some person from the school, and this interest should not be allowed to lapse. Once lapsed, such committees for the good and welfare of a vocational school are hard to establish again, for the businessmen will call it just another flash in the pan and refuse to cooperate.

The Cincinnati Graphic Arts Education Council is made up of eight men — two from each of the following organizations: Franklin Typothetae, Inc., Printers League, Cincinnati Club of Printing House Craftsmen, and the Miami Valley Lithographers Association. The members, on request from the Printing High School, were appointed by the respective presidents. Meeting

*Principal, Printing High School, Cincinnati, Ohio.

monthly for dinner in the school cafeteria, many interesting discussions are carried on for several hours. At the initial meeting of this group, it was gratifying to know that although suffering from colds, two of these men came anyway. Such interest is not to be denied in a campaign for better and more fruitful education. These representatives, indirectly and directly, have been influential in getting better equipment for the school and in the placement of graduates in the industries. The letter inviting participation and subsequent minutes of the meeting follows:

Mr. John Doe, President
Printers League
Cincinnati, Ohio
Dear Mr. Doe:

Contact with industrial groups is of vital importance to the success and adequate function of any trade school. This tie-up between employers and schools can without doubt be of great benefit. Therefore I am suggesting to the following trade groups that each appoint or elect a committee of two for participation in the operation of the Printing High School:

1. Printers League,
2. Franklin Typothetae of Cincinnati,
3. Cincinnati Club of Printing House Craftsmen,
4. Miami Valley Lithographers.

I sincerely hope that your organization will see fit to cooperate with the school, and that we can have a meeting very soon to discuss the common problems of the school and its part in the graphic-arts industry.

The purposes of this organization have been tentatively drawn up as follows:

1. To establish and maintain proper understanding of graphic-arts educational activities in the city of Cincinnati and vicinity.
2. To facilitate the necessary cooperation between printing schools and trade groups.
3. To spread information concerning the objectives of vocational education and industrial-arts education in the graphic arts.
4. To aid educational activities through the advice and experience of the various trade groups.
5. To aid the various trades in the best selection of proper material for apprentices in the graphic-arts industries of Cincinnati and vicinity.
6. To further the educational facilities of workers already employed in the graphic-arts industries.
7. To establish a library of graphic-arts material in which employers, journeymen, apprentices, and students may study and refresh themselves on all graphic-arts procedures and methods.

The enclosed folder will give an idea of what we think the school can offer.

Before we can do this, we need the active support and advice of the groups mentioned.

With all best wishes,

Sincerely,
R. Randolph Karch,
Principal

Minutes of the Meeting
Cincinnati Graphic Arts Educational Council
March 20, 1941, 5:30 p.m.

The second meeting of the Cincinnati Graphic Arts Education Council was held at dinner in the cafeteria, Printing High School, at 5:30 on March 20.

The following members were present: Mr. Emil Hirschfeld, Mr. Herbert Nieman, Mr. Lee Augustine, Mr. John M. Callahan, Mr. Carl Heaton, Mr. C. H. Waldhauer, Mr. Tom Stevenson, Jr.

A brief summary of the meeting follows:

1. Dinner in the cafeteria, 5:30 p.m.
2. Inspection of the lithography department.
3. Discussion in the office on the following business of the council. Principal R. Randolph Karch reported:

a) That the Mechanical High School office, formerly next door to the Printing High School office, has been moved to the southeast corner of the building. This means that both schools now have separate entrances, stairways, and all facilities.

b) A good buy was made on a Kluge feeder attached to a 12 by 18 C. & P. Craftsman press.

c) Since September 9, or the first day of school, 30 boys have been transferred to other schools or have left this school to work at various nonprinting jobs.

d) The total number of temporary and permanent jobs gotten for students so far this year is 80.

e) Permanent jobs obtained for students total 36 in the following 28 firms: (list appeared here).

f) Co-op jobs obtained for students total 18 in the following 9 firms: (list appeared here).

g) Considerable discussion on the placing of co-op students resulted in the following decisions by the council.

A 30-day co-op period was favored over the two-week period; that the principal should continue the work of building up co-op jobs for the rest of this year and that the council will consider at coming meetings ways and means for interesting printers in employing co-ops. The co-op idea is basically sound. Students in the 11th and 12th grades should be selected for co-op jobs, and not those in the 9th, pre10th, and 10th grades.

h) After considerable discussion on changing the name of Printing High School to Graphic Arts High School, it was decided to table this matter until some future meeting.

i) A great amount of time was spent in discussion on the equipment needs of the school which was finally decided that the two members from each organization will send a letter to the board of education endorsing the equipment budget sent to the board by Principal Karch on January 21. Carbon copies of these letters will be sent to the school to be placed on record.

j) Five pages of copies were given to each member covering "Objectives for Graphic Arts Education." The principal asked each member of the council to look over the general, and specific, and technical objectives, as set up so that a discussion could be carried on at the next meeting. Particular attention should be paid to pages 1, 2, and 3. Pages 4 and 5 can be discussed at some date later in the year, as it pertains to industrial arts (nontrade training) objectives.

Respectfully submitted,
R. Randolph Karch, Principal,
Printing High School

Contacts

The majority of printers and lithographers now in business did not get there because of trade preparation obtained in a school. Therefore it cannot be assumed that they are in sympathy with city expenditures for providing training of this type. They can be made to see, however, that the apprenticeship system is breaking down, and that one solution is the use of the public schools for training men in and for their field of work. Now that the defense program is depleting their ranks, they will be more receptive than ever to cooperate. The cry on the part of teachers and principals that they have enough meetings now is an expression of weakness.

The Printing High School
McMillan and Essex
Cincinnati, Ohio

Mr. John Doe
Doe Printing Company
Cincinnati, Ohio
Dear Sir:

Experience is the best teacher, as we who have served years in the graphic arts know well. Acting upon this adage, we have set up a series of experiences in printing and lithography for young men in both the day and the evening schools.

As these experiences do not include such things as sweeping up and carrying bundles, we feel that the boys take on a concentrated apprenticeship that is not always feasible in the shop.

You are specialists in production — we in education. Therefore when you need the services of a young man, we can help you. We know things about applicants which you are not in a position to know:

1. The skills he possesses in presswork, composition, etc.
2. His attitude toward the working world — if he likes the graphic arts and desires to remain in it, and his probable loyalty to his employer.
3. His general deportment — that is, if he comes to school or to work regularly, is not late too often, and his reaction to criticism, suggestion, and instruction.

Naturally we do not ask you to employ boys "sight unseen" — but suggest that the next time you need help call WOodburn 7967, and ask that a boy or two be sent to you for further examination and perhaps a tryout in the work you want done.

Won't you please give us an opportunity to help you?

Sincerely,
R. Randolph Karch,
Principal

The Printing High School
McMillan and Essex
Cincinnati, Ohio

Mr. John Doe
Doe Printing Company
Cincinnati, Ohio
Dear Sir:

We believe you will be interested to learn that Printing High School, recognizing the need for practical instruction in lithographic processes, inaugurated Saturday morning classes for journeymen lithographers. Seventeen men representing several leading plants attended. The response was so gratifying that additional classes were made up for Monday and Wednesday evenings. In all, approximately forty-nine men now attend weekly, and all work in Cincinnati firms.

The list of plants represented in these classes will serve to show the need: (lists appeared here).

We have secured the services of Mr. F. G. Baum to conduct these classes for journeymen.

Enclosed you will find a schedule of the course to date. Proposed enlargement of the lithography department will make it possible

for us to give instruction in all branches of camera, plate, and presswork. We would appreciate your comment and suggestions.

Sincerely,
R. Randolph Karch,
Principal

The Printing High School
McMillan and Essex
Cincinnati, Ohio

Mr. John Doe
Doe Printing Company
Cincinnati, Ohio
Dear Sir:

We now have a *Kluge* press!

As you are one of the seventy-five odd users of Kluges in the Cincinnati territory, this will be good news for you, because:

1. Our evening schools can now train your workers on this press.

2. Our day school will soon be able to furnish, on call, boys who have had training on a Kluge.

You are cordially invited to visit our school any day, or we would be pleased to have you call on Monday or Wednesday evenings during February or March.

Yours sincerely,
R. Randolph Karch,
Principal

News is welcome as copy in the major trade journals — provided it is really news and not *publicity*. One school's department of printing benefited from over 1500 inches of such news stories in 1939 in American and Canadian journals. Care must be taken to see that releases are of news value. News of educational progress is always welcomed by the local press.

Inserts, probably a page or so, are usually welcomed by the more progressive magazines, and refused by others. Letters to the editors of the various magazines will quickly determine the extent of their cooperation with educational programs.

Objectives for Graphic-Arts Education

Tentatively Set Up for Discussion
The Cincinnati Graphic Arts Education Council

Before we can investigate and set up courses of study, we must know what we want to do — hence this study on objectives.

This discussion is in two parts — objectives for vocational high school, and objectives for industrial arts as taught in the junior and senior high schools.

The objectives as outlined here are set up tentatively. After due study and investigation, it is hoped that this council can endorse a final outline on which to base the technical objectives for Printing High School (or "Graphic Arts High School") at Cincinnati, Ohio.

Objectives for Vocational Graphic Arts

I. General:

1. The general educational objectives for all high school students, as set up by the board of education of the city of Cincinnati. Quoting Dr. Claude V. Courter, Superintendent of Schools, in his report to the Board on Vocational Education, January 13, 1941:

"No narrow program of equipping some youths with immediately marketable work-skills will suffice. Not only must our youths be trained to become good workers within their capacities, but they must also be trained to live together sympathetically, tolerantly, and co-operatively . . ."

"Vocational education is now regarded as that part of the general education of every child that helps him discover his interests, equips him with knowledge of himself and his abilities, acquaints him with our industrial civilization, furnishes him with fundamental concepts of economics, industrial relationships, the occupations and occupational opportunities within his community, and the abilities required for his success in these occupations; and which further equips him with the attitudes, habits, and skills that are to determine his effectiveness as a worker."

"The purposes of secondary education are the same for all students. They are: (*a*) the maximum of self-realization for every student, (*b*) civic understanding and competence, (*c*) economic efficiency and (*d*) social appreciations and responsibilities."

"That the amount of vocational training provided in the vocational schools should be only the amount necessary for initial placement in the field for which the student is being trained."

"That the vocational courses should be planned in general to terminate at the end of the 12th year of school experience or at about eighteen years of age."

". . . the present Printing High School, now a single trade school, might well be developed into a graphic arts high school. This could be considered a single field school but provide training for a number of fields of work within the general graphic arts field. Such a school could well contain a strong department of photography, a department of commercial art, provide a well organized course in journalism, develop strong courses in written English, and still maintain the present training facilities in printing."

"If the vocational high schools should be planned to cover a period of four years of schooling beyond the eighth grade, there are good reasons for operating these schools on the same length of term as the other high schools in the city. . . . Provisions should be made in these schools also for a wide range of short summer courses."

II. Specific and Technical (Vocational)

1. An all-round experience in the graphic-arts processes during the first two years of the three-year course, with specialization during the third year in the composing room or pressroom.

a) Platen presswork: simple makeready and feeding, and care of the machines used.

b) Cylinder presswork: advanced makeready and operation and care of the machines.

c) Hand composition, make-up and imposition, lockup.

d) Machine composition: Linotype, Intertype, Ludlow, Monotype, and material makers.

e) Bindery work: cutting, pamphlet binding, etc.

f) Offset lithography: negative and platemaking, and operation of Webendorfer, Harris, and Multilith.

g) Silk screen process.

h) Photography.

i) Commercial art.

j) Journalism.

2. How to get and how to hold a job.

3. How to advance from one job to a better one.

4. What to do in order to keep up with the technological changes in the industries.

5. How to study and advance knowledge so that full benefit can be made of opportunities.

6. Technical problems of production — the how and the why of methods of production.

7. Complete coverage of competing processes — and the finer benefits of letterpress, lithography, gravure, collotype and silk screen.

8. How to develop a cooperative attitude toward the employer.

9. Working conditions, wages and hours, unions and employer organizations.

Display made up to promote public interests in Printing High School, Cincinnati, Ohio. Interest in the 500th anniversary of printing was capitalized upon by placing this display in a bank window in the downtown area for the general public; in the public library for the reading public, and in a type-founder's window for printers. Display was 13 feet long, and featured blown-up photos of school activities.

10. How to continue one's education after school days are over.
11. How to make "outside purchases" — electrotypes, photoengravings, etc.
12. How to lay out work for the composing room or for lithography.
13. How to prepare copy and how to proofread a job.
14. How to understand Social Security and Unemployment Compensation.
15. Provide knowledge of associations and organizations in the graphic-arts fields.
16. How to get along with other workmen.
17. How to understand estimating and hour costs.

Objectives of Industrial-Arts Graphic-Arts Courses

I. General:

1. The general educational objectives for all high school students as set up by the board of education of the city of Cincinnati.
2. Provide satisfaction of the desire of youth to create useful things.
3. To develop hobby interests.
4. Present the opportunity for cooperative effort in groups.
5. To illustrate and vitalize the general academic-school subjects.

II. Specific:

1. An overview of the graphic arts, which includes:
a) Letterpress printing.
b) Lithography.
c) Gravure.
d) Allied industries, such as papermaking, bookbinding, inkmaking, electrotyping, stereotyping, engraving, photoengraving, collotype, and silk screen.
2. Facts concerning careers in the graphic arts:
a) Wages and hours.
b) Opportunity for youth, statistics on employment needs of the industries, etc.
c) Working conditions.
d) Types of jobs: the 19 areas in commercial printing; status of apprentices, journeymen, master printers.
e) How to secure trade training: vocational high schools, colleges, apprenticeships.
f) Social Security, Unemployment Compensation, unions, various associations, and organizations.
3. Consumer knowledge in the graphic arts, to be of direct benefit to those who do not choose to follow the graphic arts as a career:
a) How to recognize a good job of letterpress printing, lithography, or gravure with respect to layout, color, composition, and bindery.
b) How to order graphic-arts products successfully, with regard to quality, price, and results.
c) How to make "outside purchases": photoengravings, paper, electros, etc.
d) How to select the type of graphic-arts process that best fits a given piece of work.
e) How to proofread correctly, using trade-accepted terms and marks.
f) How to prepare copy for the printer.
g) How to present and convey, by layout, the message sent to recipients of printed matter.

Safety in School Shops

ROY R. VAN DUZEE*

As long as tools and machines have been used, safety has been an important factor in the use of this equipment. Industry has made great strides in promoting safety. The passing of laws in many states requiring that safety be taught in the schools, and the adoption of courses including safety in many state outlines of instruction, have given a great impetus to the study of safety in general. The desire to avoid accidents in school shops and to teach the safe handling of tools so that this ability would carry over into industry and into the home, has also prompted teachers of shopwork to try out many ways to teach safety.

There have been three rather widely accepted ways used to present safety instruction, namely:

1. Through a separate course of study;
2. Through a unit in a course of study;
3. Having the safety information and practice integrated in the job procedure. Likewise there have been many methods and devices used to aid in the teaching of safety. Among the most prevalent have been:
1. Visual aids; movies, signs, posters.
2. Lectures, lecture-discussions.
3. Demonstrations; to the group, individually.
4. Tests and examinations; information tests, oral and written; performance, the learner working under observation.
5. Signature records; sheets, cards.
6. Safety engineer; check sheets.
7. Shop inspection check sheets by supervisor.
8. Building hazard inspection check charts by commissions, insurance companies, administrative officers.

*Supervisor of Industrial Arts, West Allis, Wis.

Some teachers use one way to present safety and some another. The same applies to the methods and devices. The sure thing that is known is that putting signs up in the shop and attaching them to machines will not be adequate safety instruction.

Shop safety is dependent to a great extent on two factors. One is shop conditions and the other is effectiveness of instruction. Another important part of safety work is what should be done if an accident does occur. The materials and methods which follow have been used effectively in the industrial-arts shops of the schools with which the writer has been connected for many years. The safety sheets have been worked out cooperatively by the teachers who have use for them in their work.

Shop Conditions

1. Machine tools should be guarded so as to pass the State Industrial Commission requirements (or other authority which passes on the proper guarding of machines for safe use) and local rules or codes. New machines should be bought subject to the approval of the state safety authority inspection. Old machines which are being altered should not be used until properly guarded. Electrical machines and devices should be purchased subject to compliance with the state safety codes. All machines should be controlled by a master switch and each motor should be independently fused and operated by an overload and under voltage control.

2. Hand tools should be in good condition at all times, that is, tools should be well sharpened, handles secure in tools, and no mushroomed tools should be used.

3. Inflammable materials should be stored in fireproof cabinets. Recommendations of the fire underwriters and the fire department relative to the use of self-closing cans and the storage of inflammable materials should be scrupulously followed.

4. Shops should be clean and in order; stock and machine parts should be arranged in orderly piles, or kept on racks or in bins. The floors should be kept clean and no refuse should be permitted to lie about. Tools should be properly stored, and the toolrooms and supply and storage rooms should always be kept in order.

The Instruction

Attitude toward safety is a most important factor in reducing accidents in any work situation. Another factor is knowing the right way — the safe way — to handle the equipment.

The best attitude toward work comes as a result of interest in the work. Natural interest in shopwork can be augmented by the inspiration of the teacher and by having the work setting right, materials at hand, work planned so that all students know what they are to do and how to do it. Probably the most effective way to teach the correct way to use a tool is to demonstrate its proper use. The demonstration may be re-enforced by the use of visual aids.

The instruction should consist of three phases: (1) the demonstration and the giving of information, (2) test for knowing and for the ability to do the operation safely, and (3) securing a record of signatures.

With reference to the materials which are to follow in subsequent issues, the "General Shop Rules" for each shop are taken

up early in the semester and thoroughly explained. Signatures of all students receiving the instruction should be recorded on the *signature sheet* for the "General Shop Rules" or on cards which are used for the same purpose. See safety sheets, signature sheets, and cards to be published later. The reason for securing the signatures is twofold; first, to be sure that all students have had the instruction, and second, to be used as evidence to show that every reasonable effort has been made to see that the student was properly instructed in the safe shop practice. Teacher liability in case of accidents to students rests on negligence. There is no negligence where all reasonable efforts have been made to teach the safe use of equipment and to maintain proper shop atmosphere for work.

Each student should have the adjustment, care, and operation of dangerous equipment demonstrated to him, either in a group or individually. Further, the student should study the instruction sheet on the equipment and respond to an objective type examination on the equipment to be used. A record of signatures of students who have received instruction on each of the machines or dangerous devices should be kept on the signature sheets provided for that purpose. See sample safety sheet, and signature sheet at end of this article. If a test is given pertaining to the safe use of a tool, machine, or other dangerous device, the test sheet with the student's name on it should be filed.

WEST ALLIS PUBLIC SCHOOLS
Office of the Superintendent
December 13, 1940
ACCIDENTS

1. Render such immediate first aid as may seem necessary and desirable.
2. In all instances, the home must be notified either by the teacher or by the principal.
3. In case of an accident the teacher should take the child to the principal's office.
4. In cases of all accidents where pupil has sustained any head injury, or in any other cases where there is the slightest doubt about the nature of the accident and its seriousness, the Police Department should be notified immediately stating the condition of the victim and the part of the body injured. This Department will then take the responsibility of determining the kind of transportation to be used—whether by squad car or by ambulance. Rule 301.404.
5. If a squad car is called, the pupil may be taken to the emergency hospital, or to his home for treatment by his family physician.
6. No child should be allowed to go home alone or should he be sent home until the school knows that someone is at home to receive the child.
7. It is impossible to lay down hard and fast rules that will cover all situations, but it must be understood that not the slightest chance should be taken in any of these cases.
8. The case should not be considered as taken care of until the principal is assured that the necessary immediate medical attention has been provided.
9. A detailed report of the accident should be turned into the principal's office on the day of the accident.
10. Follow-up reports must be sent to the office until the case is closed.

H. B. Nash,
Superintendent.

Fig. I. What to do when an accident occurs.

WEST ALLIS PUBLIC SCHOOLS
West Allis, Wisconsin
ACCIDENT REPORT

Injury sustained by.....
Place on body where injured.....
Address .....
Name of school or playground.....
Date of injury [please state exact hour].....19..... at .....M.
Was the accident reported to school physician or nurse?.....When.....What result.....
Were parents notified or was there an effort made to contact the home?.....
Describe the accident fully and state what external or visible evidence of same you find on examination. .....
.....
.....
What aid was given immediately after injury?.....
Is [he] [she] subject to or affected by any bodily or mental disease, weakness, infirmity or deformity or previous injury which might contribute to cause the accident?.....
.....
Any other facts of importance or interest.....
.....
.....
Any witnesses to accident:
..... Signed .....
..... Position .....
..... Date .....

NOTE: 1. This report is made in quintuple. One copy is filed in office of Superintendent of Schools, one copy is sent to School Physician, one copy is sent to City Attorney, one copy is sent to Secretary of Board of Education and one copy is sent to Parent or Guardian of Child.
2. In every case a follow-up report must be made to the Superintendent's office not later than one week after the accident. The person making out this report is responsible for the follow-up reports.

Date..... Principal .....

Fig. II. Accident report.

WEST ALLIS PUBLIC SCHOOLS
West Allis, Wisconsin
FOLLOW-UP ACCIDENT REPORT

Name of School [Playground].....
Injury sustained by.....
Address .....
Place on body where injured..... Date.....19.....at.....M.
Remarks stating what follow-up was made and what is the present status of the case:
.....
.....
.....
.....
Signed .....
Position .....
Date .....
Principal .....

NOTE: 1. A follow-up report should in all cases be made not later than one week after accident.
2. Continuous reports should be made at such intervals as the principal deems necessary until the case is cleared up.

Fig. III. Follow-up accident report.

Procedure in Case of Accidents

All shops should be equipped with a first-aid kit. This kit should contain the necessary medical supplies with which first aid may be rendered. The procedure to be followed in case of an accident should be carefully worked out in advance. In the situation under consideration it consists of three things: (1) render first aid and send or take the pupil to his home or to the hospital, (2) send an accident report to the principal's office, and (3) make a follow-up report.

The medical kit should be easily accessible but it should not be open to the students except by special permission. However, it is doubtful whether the kit should be under lock and key.

The procedure to be followed in case of an accident is outlined in Figure I. The accident report blank is shown in Figure II and the follow-up report in Figure III. These forms suggest how accidents might well be taken care of. They should be de-

No student should be permitted to work on a power machine, or with a furnace, or forge, or handle hot metals unless he has received proper instruction and has signed the signature sheets or cards indicating that he has had such instructions.

tailed enough to provide all information necessary, but be made as easy to make out as possible. There is no way to eliminate reports and follow-ups if accident cases are to be properly taken care of.

Experience has shown that the accident ratio in the shops is less than it is in many activities which are not thought of as being dangerous. This is due, no doubt, to the emphasis which is placed on safety instruction in the school shops. A well-worked-out safety program prevents accidents, takes care of the few which do occur, and provides a plan to show that the instruction has done its utmost to eliminate accidents. The teacher, therefore, is relieved of the possibility of having negligence proven.

Sample Safety Sheet

Mr. Hughes Mr. Knoblauch Mr. Zarling
Auto-Mechanics Shop Safety Rules

1. Students must be attired in shop clothing which will cover both shirt and trousers completely.
2. Playing, scuffling, and inattention to work will be cause for dismissal from the course.
3. On any machine provided with a guard, the guard must not be removed without the consent of the instructor.
4. While working with or on keen-edged tools, the hands must always be behind the cutting edge of the tool.
5. The use of worn-out or improper tools, such as damaged hammers, cold chisels, files without handles, etc., is strictly prohibited.
6. No student shall go under a car while it is being hoisted or jacked up or held off the floor only by the hoist or jacks. The car must be supported by axle stands or auto supports which are so placed that there is no danger of the car slipping off them.
7. Whenever a wheel or other supporting member is to be removed from a car, the axle stand or auto support shall be used and its method of placement shall be inspected by the instructor before the wheel or other supporting member is removed.
8. No student shall pass under or work under a hoist which is carrying a load. Care should be taken when working around a hoist to see that there is ample clear space in which to work.
9. Motors are not to be run in the shop until proper steps for the removal of exhaust gases have been taken. Such steps shall include: (*a*) lowering of a shop exhaust pipe; (*b*) opening two dampers in the exhaust pipe; (*c*) turning on the shop ventilating fan so as to force fresh air into the shop and force foul air out of the shop.
10. Care should be taken when using the electric drill to see that the hands do not come in contact with the revolving parts of the drill when starting to drill or while drilling holes.
11. When using the arbor press see that the parts being pressed are properly supported on the table and free from oil or grease so they will not slip when pressure is applied to them thus causing injury to the worker.
12. Extension cords with damaged insulation or bare wires are not to be used until repaired and the repairs inspected by the instructor.
13. Heavy car parts shall be handled by using the hoist to obviate injury due to over-lifting or to dropping heavy parts on workers.
14. Care should be exercised when carrying objects to see that there are no obstructions in the path of travel.
15. The car jack is not to be used as a scooter.
16. While welding is being done, students shall remain at a safe distance from the person doing the welding.
17. Persons welding shall wear goggles, also persons watching welding at a short distance shall wear goggles.
18. Before starting a motor, make sure that the car is in neutral, that the hand brake is set. and retard the spark for hand cranking.
19. While lighting the welding torch or while welding, the flame must always be directed away from the welding hose. and so that the torch when lighted will not burn anyone.
20. Before lighting the welding torch, the operator of the torch shall see that there is no danger of igniting the clothing of anyone who may be near by.
21. If anyone's clothing were to catch fire

West Allis Public Schools
Industrial Arts Department
Auto Mechanics Shop

Hour_____ Date_____ Instructor_____

I have carefully read all of the Auto Mechanics Shop Safety Rules and regulations, and have had them explained by the instructor in charge. My conduct while in this shop will be governed by the above rules and regulations.

1		25	
2		26	
3		27	
4			
		46	
23		47	
24		48	

Signature blank for the auto shop

WOODSHOP

Gen. shop rules	Circular saw	Band saw	Planer	Jointer	Lathes
Jig saw	**Sander**	**Router**	**Shaper**	**Cut off saw**	

METAL WORK

Gen. shop rules	Shaper	Hack saw	Power drills	Grinders	Hot metals	Square shears
Lathe	**Milling Machine**		**Hand tools**			

ELECTRICAL WORK

Gen. shop rules	Grinder	Power drills	Electrical energy

PRINTING

Gen. shop rules	Paper cutter	Carving tools	Presswork

AUTO MECHANICS

Gen. shop rules	Grinder	Power drills	Arbor press	Blocking up loads	Use of crane

Safety record card

West Allis Public Schools

INDUSTRIAL ARTS DEPARTMENT

Date_____ 19_____

I have carefully read and have had explained to me the general shop rules covering the regulations and rules relative to conduct in the _____ shop, also I have had instruction in the care, adjustment, operation and safety relative to the machines checked on the reverse side

Student _____

School _____

This is to certify that _____ has passed an examination in the use of the machines checked on reverse side and is permited to operate them at his own risk.

Pupils will not be allowed to use the shop machinery unless they posses one of these cards, duly signed by the school instructor or a previous West Allis shop teacher.

Neglect to follow rules pertaining to the operation of the machinery will result in this card being withdrawn.

Instructor_____

Instructor of_____

School_____

Record card which student and instructor have to sign

he should *not* run, but should quickly lie down on the floor. Persons near at hand should quickly smother the flame with a fire blanket or other cloth or fabric material available.

22. When a motor is mounted on a stand, be sure that both ends of the motor are securely fastened to the stand before turning the motor over.
23. Persons must stand clear of the ends of the rails of a motor stand when the motor is being turned over.
24. Locking devices of motor stands are not to be loosened until one person has a firm hold on the handles of the crank.
25. After turning a motor over, all locking devices must be securely fastened before doing any work on the motor.
26. Care must be exercised when placing objects, particularly round objects, on a workbench to see that they are so placed or blocked that there is no danger of them rolling off the bench, thereby causing possible injury to the feet of the workers.

(To be continued)

Relation of Industrial Arts to Vocational Education

WALTER E. DURBAHN*

The gap between industrial arts and vocational education is not as wide as some would have us believe. Although the intent of the Smith-Hughes legislation was to foster specific trade training, ample provisions were made to give general training in the trades and occupations.

This general training is afforded through what is known as All Day General Industrial Courses, designed especially for cities of less than 25,000 population. Since a large percentage of our population is in cities of less than 25,000 such training can be made available to many youths throughout the country.

There should not exist any feeling among the public, or especially among the teachers of industrial education, that any one phase of the program is of greater importance than the rest. The young people today who enter industry require all phases of the industrial training program offered in our modern school curriculum: industrial arts, general industrial, technical, and vocational or specific trade training. What is important is the youth whom we wish to help. Are we making life more meaningful for him, leading him to find his interests, and developing these interests, together with skills and knowledge, so that he may fill his place in the world of tomorrow as a happy, useful man, and an efficient citizen?

The modern young man must be developed into a more efficient purchaser and consumer of industrial goods, be able to express himself clearly, be made safety conscious, taught to respect approved hygienic practices, and learn to appreciate good design and workmanship. He should develop an interest in, and an understanding of, the place of industry with its materials and processes, in social economic life. Industrial arts not only lays the foundation for such industrial pursuits, it also offers preliminary exploratory experiences in many occupations. All this is of great importance for those who will enter industry and of equal importance for those who plan to go to college, as it enriches the curriculum and is an aid in developing a better understanding of industrial problems. One of the greatest problems confronting the secondary school is to help the student select a vocation which will enable him to develop his interests and abilities, and to insure him a livelihood. Many factors enter into this selection, such as, aptitudes, economic status, interests, and experiences. Where general exploratory experience is offered early in the high school curriculum together with wise guidance and counseling, the student is enabled to select a field of vocational endeavor by the end of the ninth or tenth grade.

Should the student select something in the trades or occupations, he may then, if the school has adequately prepared for his needs, enter at once into a course which deals directly with that field, its problems, processes, tools, and information. General courses where practical experiences can be had in a group of related occupations such as graphic arts, building trades, woodwork, metalwork, drafting, and the like, will be the best answer to this problem. Such training is essential at this stage for once he has chosen a specific occupation his training becomes limited to that occupation and his horizon is correspondingly narrowed. Although industrial arts, as we have pointed out, can very satisfactorily give exploratory experiences in the use of materials and through general industrial information, real exploratory experiences in occupations can be had only where real life situations can be set up, such as the building of a house, where students work under actual conditions as they will later find in the trade, where weather conditions, materials, tool processes, values and standards of the trade must be met. Many a lad has entered such a course determined to become a plumber or carpenter only to discover, through the practical experience which it offers, that it was entirely different from what he had anticipated. The all-day general-industrial or pre-employment courses featured by the Smith-Hughes legislation are designed to supply this most desirable practical experience in the trades or occupation.

If the secondary school is to be of real value to youth in making an intelligent choice of vocation, it has three services to perform: (*a*) It must give him a general background, preliminary exploratory experiences before the end of the ninth and not later than the tenth grade which will enable him to choose his field. (*b*) If the selection is in industry the school must then supply general practical experiences in trades and occupations. (*c*) This would bring him to the final stage — specific trade or occupational training which can be offered during the senior year if not earlier.

Highland Park High School has had a general-industrial or pre-employment course in the building trades for fifteen years, and in the metals course for nine years. The school, situated in a residential suburb of Chicago, has enjoyed a high scholastic reputation gained through its many graduates at outstanding colleges and universities of the country. Even this type of community and school has a great number who must enter employment after graduation. Many years ago, Highland Park recognized the needs of this group, and proceeded to meet it, at least in part.

Only recently the writer interviewed the president of one of the largest and best-known industrial organizations in the Chicago area. This man had received his secondary school training in the old English High and Manual Training School of Chicago, where two hours a day, five days a week, for three years was spent in the shops and drawing room in order to develop, through thorough training, skills in the use of tools, the kind of skills that are being criticized by advocates of modern education. After graduation he applied for a job as a draftsman in this well-known industrial plant; however, as there was no opening in that department, he was put to work in the machine shop for which his general high school training had prepared him. He never did become a draftsman. His interview again emphasized the need for general trade or occupational experi-

*High School, Highland Park, Ill.

ences with plenty of time for the development of skills.

The writer's own experience bears out the views of this industrial executive. He, too, developed his educational theories from experience gained as an instructor in the building trades for 15 years, in industrial arts for nine years, and a number of years at the trade. During his 15 years as teacher in the building trades, his department has erected buildings valued at $180,000. This has given him abundant opportunity to recognize fundamental values in such a course of general-industrial or pre-employment training.

The educational aims of this building-trades course at Highland Park parallel those of industrial arts previously stated, but with these additions:

1. To provide a more practical basis for occupational choice and training.

2. To prepare the student for advantageous entrance and successful participation in the building trades and kindred occupations as a means of earning a livelihood.

3. To acquire knowledge of and skill in the performance of fundamental processes of the following trades: carpentry, masonry, plumbing, sheet-metal work, painting, and electric house wiring. Each boy spends half of each day in the shop, and the other half in related work which includes individual instruction in blueprint reading, architectural drawing, related mathematics and science, English and social science. Wherever possible the academic work is correlated with the shop-work.

For 13 years the department did not have a shop. Their shop was the building under construction. At the end of this school year they will be comfortably housed in a new building of their own design and construction. This building has been under construction by the students during the past three years and it will house the metalwork of both the industrial-arts and general-industrial classes, the related academic work as well as the building trades.

It has been found advisable to give students who choose the building trades as a field of endeavor, a year in the shop, rotating them through the six major building trades and allowing to each trade three hours a day, five days a week for six weeks. The following year these boys will receive construction experiences in the erection of a house or building. Even though a whole year is consumed in the erection of a building, little time can be given for the training in developing skills for particular work; therefore the fundamental tool processes, and the related and technical information should be independent of and previous to construction. Exploratory values can be derived even though such a training follows construction.

As a student advances in his industrial training, not only do objectives change but also methods. It is well to adopt boy standards for the boy during his early training, but this should not always be continued. When a boy plans to enter an occupation he must be made to realize other standards, standards set up by the trade, by the buying public. He should be made conscious of these standards and be taught to measure up to them. This realization can be very forcefully obtained through the erection and sale of a student built house. The one difference which exists in trade standards produced by a high school boy and one set up in industry is the element of time. High school students cannot and should not be expected to produce at the same rate of speed as industry demands; but skills, neatness, and accuracy can and should be expected of him.

During his early training the boy was allowed to make things for himself and of his own selection, now the work he produces is for others, except possibly that of an exercise piece to develop certain skills. No longer can he use the argument that it is good enough since it is only for himself, for the work he now turns out has a commercial value and is paid for by the public.

Although it is advisable to develop specific skills needed to perform a job, we must not lose sight of character traits, those personal qualities which help a person get along with other human beings. These qualities are very essential in industry as they help the worker keep his job and enable him to make adjustments throughout life. Several studies have been made of discharged workers. These studies point out that skill and knowledge form only a small percentage of the causes of discharge. Carelessness, noncooperativeness, laziness, dishonesty, lack of initiative, of ambition, of loyalty, of courtesy, and the like, are the more frequent causes. When a project such as the erection of a building is undertaken, students are thrown together for three hours a day. They must work together, all striving for the same ultimate goal — the completion of the building. This is real life and the sooner that youth can learn to work under such conditions the quicker he will be able to master the art of living.

The general-industrial course has the necessary machinery or organization to further part-time education for apprentices, evening-trade-extension programs for adults and journeymen, and for the training in new industrial developments, thus extending the service of the high school to the community that supports it.

Last but not least is the value which students preparing for engineering colleges can derive from such courses. If the crowded high school curriculum would permit the student to take this practical experience and training in the use of tools, for five half days per week for one school year, he would better understand the industrial problems which he will later be called upon to solve. When will the architect ever get the opportunity to erect a house and actually have a hand in the building of it, using the tools and handling the materials? His college course certainly does not include it, yet he must later design, plan, and supervise building construction.

The American public is constantly looking for short cuts, easier ways of doing things. This is quite all right, for we should encourage the use of the head to save the back, but there is no real short cut in developing a good mechanic, one who not only can use tools skillfully but also knows materials, their relation one to the other, one who also has an artistic sense and appreciation of social problems. It takes years to develop such a mechanic and the training should start early in life.

Therefore, with intelligent understanding of the relation of all the phases of industrial education, we will help youth to make an early selection of his field of endeavor, to develop definite skills in the use of tools and related information, to choose wisely his specific vocation, and to be ready for vocational adjustments in later life. If the school then affords him the opportunity to receive specific training in one occupation followed by intensive training after graduation, it will prepare a real mechanic, one who not only can perform but loves to perform. The product of all our endeavors will then exemplify the truism:

If the hand and eye are deftly trained,
Strong grows the will and keen the brain.
— *Goethe*

THINGS TO THINK ABOUT

R. W. Selvidge,
University of Missouri,
Columbia, Mo.

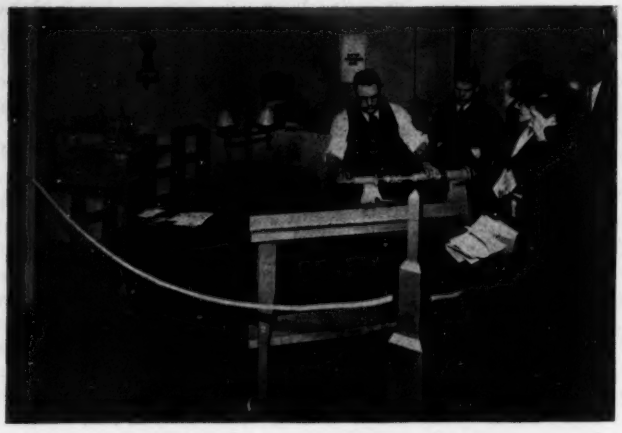
The purpose of our schools is to provide selected experiences in a selected environment.

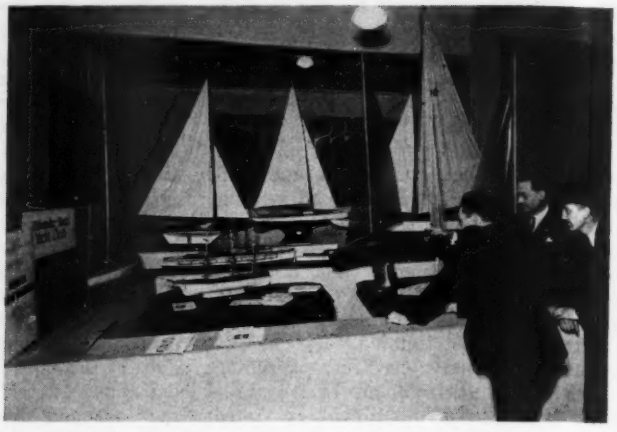
Assisting students in the wise interpretation of experiences is one of the most important phases of education, and one of the most neglected.

Experiences give us skill, information, and factual material which are valuable tools in supplying our wants, but they do not give us ideals. Ideals are developed only through the wise interpretation of our experiences.

Ideals are not the result of learning subject matter but of the interpretation of subject matter. Beyond our physical requirements they set the goals which inspire us to action and constitute a compass to guide us in our activity.

It is the teacher's responsibility to guide the learner's excursions into the field of factual material and subject-matter skills and to aid him in selecting, acquiring, and interpreting those which appear to be most helpful in developing him into a happy, useful, and successful citizen. It is also his duty to set up tasks in such a way as to develop skills in intellectual procedures and practice in those social virtues which are the basis of good character and worthy citizenship.





Cabinetmaking and modelmaking are favorite hobbies with many

Creative Hobbies

A. G. PELIKAN*

The number of extramural activities in the junior and senior high schools has increased constantly, as has also the recognition on the part of leading educators, that such activities have considerable educational value. As interest in a subject is aroused, the learning process is aided, and what may start out merely as a wholesome leisure-time activity, frequently helps in deciding the vocational career of a student, or makes the student realize the value of other school subjects such as mathematics, physics, art, industrial arts, chemistry, history, and the like.

In most instances extramural activities are planned and organized with a definite view to broaden the students' interests in practical and cultural subjects on a purely voluntary basis, and to offer at the same time the opportunity for an outlet of latent talents along a variety of lines.

Many a student's life has been influenced and his career determined by participation in group activities organized in the school, outside of regular class hours and free from teacher domination.

Qualities of leadership and initiative have been developed, self-confidence and cooperation made possible, and interest aroused to an extent often not possible in the classroom.

Voluntary and self-directed effort has beneficial effects in all branches of endeavor, and is indeed a valuable trait to encourage and foster in every way possible. Extramural activities frequently are carried on after graduation by means of hobbies originally initiated in the schools.

Among the most popular and valuable hobbies with a definite creative value are such activities as photography, astronomy, woodworking, arts and crafts, drawing and painting, archery, navigation, modelmaking, dramatics, and the like. Hobbies in which active participation on an organized basis is planned, or activities in which skill and creative ability are developed, are to be preferred to the mere collecting of items without much purpose. Students with the collecting instinct may frequently be directed into worth-while channels under proper guidance, and with the cooperation of the Public Museum. The illustrations which accompany this article show a few of the hobbies which undoubtedly had their origin in some of the extramural activities of our schools. Among the members of the different hobby groups

*Director of Art Education, Milwaukee Public Schools, Milwaukee, Wis.

Both women and men hobbyists are among those who choose weaving and aeronautics to while away their leisure

may be found men and women of all age levels and from all walks of life, who meet in true democratic fashion for the exchange of ideas, to work together, and to offer help and encouragement to the amateur with similar interests.

For a number of years the Milwaukee shop in order, or work of that nature.
Home Show, as part of the educational program, has invited the members of the Milwaukee Hobby Council to exhibit examples of work of their members at the annual home show held at the auditorium each year. The interest aroused by means of these exhibitions has been beyond expectations.

At a time when skilled hands are needed more than ever for national defense, these extramural activities in our schools and the hobby groups outside of schools, should be given every encouragement by school people and others, in all communities interested in wholesome recreative leisure activities for its young people as well as for adults.

Milwaukee Art Institute Men's Sketch Club Booth at the hobby exhibition which was visited by one hundred thousand persons

Archery and astronomy have many adherents among the adult hobbyists

Visual Aids in Vocational Education

FRANCIS J. COYTE*

Visual aids in the vocational school fields are fast becoming an integral part of the education program. During the past few years, emphasis has been placed on perceptual learning through stimulation and interest in all subjects to which films have been adapted.

Unfortunately, there exists at the present time, a taboo or "hands off" policy concerning the listing of vocational-industrial films by our public school, university and educational film exchange libraries, because of the advertising content that must be included in the pictures if industry continues to produce free films. In the larger cities, the vocational teachers avail themselves of the services provided by the visualization departments, while the smaller school systems depend largely on the commercial film rental libraries, government agencies, and direct mail contact with booking agencies and manufacturers. True, the Bureau of Mines lists many general industrial films and processes that do not feature specific products, and thereby escape some of the criticism leveled at the so-called *advertising films*. This situation and attitude on the part of visualization directors can be vaguely explained on a basis of fear of favoritism, or of possible complaints by industrial concerns whose pictures have not been shown. The directors may also anticipate a siege of requests that will deluge their departments, and a possible demand that all students of vocational age be permitted to see certain pictures. However, this situation has not developed in spite of the fact that the vocational schools have enjoyed a certain degree of freedom because of the direct industrial interests and contacts represented by the vocational instructors.

The tentative report of the American Council on Education Survey of Visual Education Facilities, which includes all types of public schools, reveals the following:

"Mechanical audio-visual aids, which include motion pictures, lantern slides, film strips, are quite understandably not employed as widely in education as the simpler nonmechanical aids. However, the survey brought to light a rapid rate of growth in the school consumption of both

*Clifford B. Connelley Vocational High School, Pittsburgh, Pa.

radio programs and motion pictures. In the larger school systems, a greater and more uniform use of all audio-visual aids was reported."

Subjects in which motion pictures are used:

Subject	*Number reporting use*	*Per cent*
Science	3,820	22
Travel and Geography	3,013	17.4
History	2,600	15
Social Science	1,505	8.7
Health	1,402	8
English	1,393	8
Nature Study	909	5.2
Commerce and Industry	724	4.2
All others (Agriculture, Mathematics, Music, Religion, etc.)	1,862	11.5
	17,228	100

It is evident from this tentative report that a large number of industrial films actually available free of charge in vocational fields are not listed in school visual catalogs because of the advertising content. The relatively small number of schools reporting the use of industrial films shows that the shop teachers are not using the films available, or they lack the equipment to show them in the shops or classrooms.

"The greatest handicap reported was the lack of a sufficient budgetary provision for the work. Next was the fact that the schools were unable to get the proper aids in the classroom when most needed. Ranking third was the declaration that the teachers were insufficiently trained in the use of visual aids. The fourth complaint was that the available aids fail adequately to cover the course of study. Fifth, a lack of understanding of the value of visual aids. The sixth difficulty recorded was the lack of information on sources of desirable films and other visual aids. Many of the teachers in the nation's schools have had little or no training in the use of visual aids. Yet it cannot be said that because of this these teachers are not qualified to teach. In many of our schools, the use of visual aids is left entirely to the teacher's discretion. However, a great problem is presented in training the present staff, and from the report there seems to be a difference of opinion as to the most expedient manner of accomplishing this end. Apparently three courses are open. First, that the teacher be required to attend a college or university and secure this training. A few states already require this of new teachers, but the main problem lies in training those who have completed the requirements imposed prior to this time and are now teaching. The second method requires the teacher to take a course in the use of visual aids from an extension division of one of the many universities offering such a course. The third means of training the present staff is accomplished by employing a supervising teacher of visual instruction, whose duty is to work with the teachers and show them how to make the best use of the various visual aids, and plan and assist in the selection of films, slides, etc., to be used by the entire school or school system. Several school systems reported that the latter course seemed the most expedient and flexible and, moreover, that it was employed successfully. The advantage of this method over the others outlined can be readily seen, as it meets the individual and specific problems of each school and teacher, and it is coupled with practical adaptation and experience, which is of paramount importance."

The supplementary visual-aid materials listed are offered as a possible source of help to the shop, related and academic teachers in the vocational schools, so that they may secure desirable sensory materials and films that will enrich the teaching program and improve instruction.

Supplementary Visual Teaching Materials

Automotive Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

FORD MOTOR CO., Dearborn, Mich.
- A Visit to Rouge Plant.

GENERAL MOTORS CORP., Detroit, Mich.
- Opportunity for Youth in Building the World of Tomorrow.
- When the Wheels Revolve.
- We Drivers.
- Transportation Progress.
- Research Looks to New Horizons.
- Optics and Wheels.
- Modes and Motors.
- Metallurgy and Wheels.
- Chemistry and Wheels.
- Diesel the Modern Power.

GOODYEAR RUBBER CO., Akron, Ohio.
- Story of the Tire.
- Rubber and the Goodyear Plantations.
- Life of Charles Goodyear.
- Motion Picture Catalog (40 educational subjects listed).

NORDBERG MFG. CO., Milwaukee, Wis.
- Diesel Engines, Bulletin 39A.

PEP MFG. CO., INC., 33 West 42nd St., New York, N. Y.
- Valve Grinding Compound — free sample.
- Information Circular on Valve Grinding Compound.
- Gasket Paste — free sample.
- Information Circular on Gasket Paste.
- Korode Kure — free sample.
- Information Circular on Korode Kure.

SOUTH BEND LATHE WORKS, South Bend, Ind.
- How to Run a Lathe — 25c.
- How to Cut Screw Threads — 10c.
- How to Grind Cutter Bits — 10c.
- Modern School Shops, No. 55-R.
- Modern Industrial Shops, No. 88.

U. S. RUBBER CO., Rockefeller Center, New York, N. Y.
- Romance of Rubber.
- Educational Experiment — 25c.

Crafts Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

AMERICAN CRAYON CO., Sandusky, Ohio.
- How to Do Linoleum Block Printing.
- Water Colors Booklet.
- Colors for Textile Decoration.

EASTMAN KODAK CO., Rochester, N. Y.
- Outline for Photographic Courses, Booklets and Lecture Loan Service. (When writing, give full details as to nature of work being carried on. The material is especially useful to teachers of science courses, photography, and teachers serving as counselors of camera clubs.)

GANE BROS. AND LANE, INC. St. Louis, Mo.
- Bookbinders Supply Catalog and Samples.

GAYLORD BROS., INC., Syracuse, N. Y.
- Bookcraft Instruction Manual.

W. A. HALL AND SON, Boston, Mass.
- Samples of Art Leathers.

H. H. PERKINS CO., 256 Shelton Ave., New Haven, Conn.
- Reedcraft.
- Instructions in Methods of Seat Weaving.
- Price List of Chair Seating Materials.

THAYER AND CHANDLER, 910 W. Van Buren St., Chicago, Ill.
- The Idea Book.

TANNERS COUNCIL OF AMERICA, 100 Gold St., New York, N. Y.
- Romance of Leather

UNIVERSAL HANDICRAFTS SERVICE, INC., 1270 Sixth Ave., New York, N. Y.
- Supply Catalog.
- Manual on Non-firing Clay — 25c.
- Rubber Mold Manual — 10c.
- Instructions in Silk Screen Printing — 10c.
- Synthetic Amber Manual — 25c.
- M-5 Design Sheets in Metalry — 25c.

Drawing Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

AMERICAN CRAYON CO., Sandusky, Ohio.
- Prang Tempera Showcard Colors (Folder and Color Chart).

AMERICAN LEAD PENCIL CO., 500 Willow Ave., Hoboken, N. J.
- Story of the Lead Pencil, No. 13.

EUGENE DIETZGEN CO., 2425 Sheffield Ave., Chicago, Ill.
- Use and Care of Drawing Instruments, Lettering Chart.

CHAS. M. HIGGINS CO., 271 Ninth St., Brooklyn, N. Y.
- Higgins Correlation Projects, No. 9.
- Drafting Standards Accepted and Proposed (free to teachers of mechanical drawing and professional draftsmen only — others 25c. per copy).

KEUFFEL AND ESSER CO., 520 South Dearborn St., Chicago, Ill.
- Instructions for Use of K and E Architects' Levels.
- How to Choose a Slide Rule.

NATIONAL COAL ASSN., 15th and H Streets, N.W., Washington, D. C.
- 1939 Basement Plan Book.

FREDERICK POST CO., Hamlin and Avondale Aves., Chicago, Ill.
- Architectural and Engineering Symbol Chart.
- Drawing and Drafting Room Guide.
- Decimal Equivalent Transfers.

Electric Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

L. B. ALLEN CO., 6767 Mawr Ave., Chicago, Ill.
- Samples of Aluminum Solder.
- Aluminum and How to Solder It.

AMERICAN TELEPHONE AND TELEGRAPH CO., 195 Broadway, New York, N. Y. (Or from local Bell telephone business offices.)
- The Magic of Communication.

ELECTRIC STORAGE BATTERY CO., Philadelphia, Pa.
- Fundamentals of Storage Battery.
- Battery Lecture Wall Chart.

GENERAL ELECTRIC CO., Schenectady, N. Y.
- Essential Items for an Electrical Laboratory, Bulletin GEB-62B.

GENERAL MOTORS CORP., Detroit, Mich.
- Electricity and Wheels.
- Optics and Wheels.
- Research Looks to New Horizons.

KESTER SOLDER CO., 4201 Wrightwood Ave., Chicago, Ill.
- Samples of Kester Acid-Filled Plastic Rosin-Filled Solders.
- Kester Fluxes — Samples.
- Kester Viscosiformed Soldering Paste — Samples.
- Kester Trichloron Soldering — Samples.

NATIONAL BOARD OF FIRE UNDERWRITERS, 222 W. Adams St., Chicago, Ill.
- National Electric Code No. 70. Single copy free — 5c. in quantity.

NATIONAL CARBON CO., 30 E. 42nd St., New York, N. Y.,
- Fun with Batteries — 10c.
- History of Portable Light.

NATIONAL ELECTRIC PRODUCTS, Pittsburgh, Pa.
- The New Way to Wire a House.

STANDARD ELECTRIC TOOL CO., 1938 W. 8th St., Cincinnati, Ohio.
- Tool and Supply Guide.

U. S. ELECTRICAL TOOL CO., Cincinnati, Ohio.
- Portable Electric Tool Catalog, No. 55.

WESTINGHOUSE ELECTRIC AND MFG. CO., 2211 West Pershing Rd., Chicago, Ill.
- Artificial Light and Its Application — $1.25 (individual chapters in pamphlet form — 7c each).

WESTON ELECTRIC INSTRUMENT CORP., Newark, N. J.
- Wall Charts of Weston Instruments.

Industrial Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

AMERICAN PETROLEUM INSTITUTE, 50 West 50th St., New York, N. Y.
- Petroleum Drilling and Production Chart.
- Petroleum Transportation, Storage and Market Charts.
- Petroleum Refining Chart.

BAKELITE CORP., 30 East 42nd St., New York, N. Y.
- Bakelite Horizons — The Story of Modern Plastics.

CHEMICAL PUBLISHING CO., INC., 234 King St., Brooklyn, N. Y.
- Technical Books on all Subjects.

CORN INDUSTRIES RESEARCH FOUNDATION, 5 East 45th Street, New York, N. Y.
- Tapping the Treasure in Corn.
- Corn in Industry.

FLEISHER YARNS, INC., 32–36 Mercer St., New York, N. Y.
- From the Sheep to the Needle.
- Illustrated Leaflet of Elementary Crochet and Knitting Stitches.

B. F. GOODRICH CO., Akron, Ohio.
- Wonder Book of Rubber.

GOODYEAR RUBBER CO., Akron, Ohio.
- Charles Goodyear — Biography.
- Story of the Tire.
- Rubber and the Goodyear Plantations.

HAMMERMILL PAPER CO., Erie, Pa.
- Hammermill Educational Exhibit — Teachers' Packet — 15c.
- Chemistry and Science Exhibit — $1.

MASONITE CORP., 111 W. Washington St., Chicago, Ill.
- Samples of Products.
- Literature on Products and Use in Home.

MORTON SALT CO., 208 W. Washington St., Chicago, Ill.
- History of Salt.

NATIONAL COAL ASSN., 15 and H Streets, N.W., Washington, D. C.
- Story of Bituminous Coal.

PLATE GLASS MFRS. OF AMERICA, Pittsburgh, Pa.
- Plate Glass Booklet.

PUBLIC AFFAIRS COMMITTEE, 30 Rockefeller Plaza, New York, N. Y.
- Man Meets Job — How Uncle Sam Helps — 10c.

UNITED STATES RUBBER CO., 1790 Broadway, New York, N. Y.
- Romance of Rubber.
- Educational Experiment — 25c.

VERMONT MARBLE CO., Proctor, Vt.
- Miracles of Marble.

WESTERN STATES ENVELOPE CO., 1616 W. Pierce St., Milwaukee, Wis.
- Guide of Envelope Information.

WHEAT FLOUR INSTITUTE, 309 West Jackson Blvd., Chicago, Ill.
- From Wheat to Flour.
- How Flour Is Milled.

Metalwork Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

ABRASIVE CO., Tacony and Fraley Sts., Philadelphia, Pa.
- Grinding Wheel Data Books.
- Safety Code for the Use, Care, and Protection of Abrasive Wheels.
- General Purpose Grinding Wheel Folders (10c. charge for more than 1 copy).

L. B. ALLEN CO., 6767 Mawr Ave., Chicago, Ill.
- Samples of Aluminum Solder.
- Aluminum and How to Solder It.

ALUMINUM CO. OF AMERICA, Pittsburgh, Pa.
- An Outline of Aluminum.
- Aluminum — Its Story.
- Twixt Wood and Weather.
- The Working of Aluminum Alloys.
- Display Chart on Aluminum.
- Aluminum Paint Manual.
- Finishes for Aluminum.

AMERICAN GAS FURNACE CO., Elizabeth, N. J.
- American Heat Treating Furnace Machines.
- Forges and Furnaces.

AMERICAN HANDICRAFTS CO., 193 William St., New York, N. Y.
- Instructions for Etching.
- Instructions for Finishes of Iron.
- Course of Study.
- Tool Equipment List for Beaten Metal Work.
- Tool Equipment List for Wrought Iron Work.

AMERICAN ROLLING MILL CO., Middletown, Ohio.
- A Visit to Armco.

AMERICAN WELDING SOCIETY, 33 West 39th St., New York, N. Y.
- Code for Fusion Welding and Gas.
- Cutting in Building Construction — 25c. (The foregoing code will be reissued sometime during the summer under the title "Code for Arc and Gas Welding in Building Construction." The price of the revised code has not yet been determined.)

ARMSTRONG BROS. TOOL CO., Chicago, Ill.
- Wall Charts on Lathe Tools.
- Planer Tools (chart).
- Boring Tools (chart).

ATLAS PRESS CO., Kalamazoo, Mich.
- Atlas Shop Equipment.
- Manual of Lathe Operation — 75c. (spec. instructor's price).
- Blueprint Wall Charts on Lathe Practice — 10c. per set of 3.

BEHR-MANNING CORP., Troy, N. Y.
- Lecture Course on Coated Abrasives.
- Wall Chart — Coated Abrasives for Finishing Metal.
- Colored Wall Chart — The Manufacture of Coated Abrasives.
- Wall Chart — Coated Abrasives for Metal Working.

BOICE-CRANE CO., 930 W. Central Ave., Toledo, Ohio.
- Instruction Book on Metal Spinning — 10c.

CARBORUNDUM CO., Niagara Falls, N. Y.
- Carborundum Brand Products for the Home Craftsman.

CHICAGO FLEXIBLE SHAFT CO., Roosevelt Rd. and Central Ave., Chicago, Ill.
- Heat Range Chart.

CHICAGO GEAR WORKS, 440–450 N. Oakley Blvd., Chicago, Ill.
- Gear Catalog.

CLEMSON BROS., INC., Middletown, N. Y.
- Metal Cutting Booklet — 10c.

CLEVELAND TWIST DRILL CO., Cleveland, Ill.
- Handbook for Drillers.
- Ready Reference Book for Drill Tables (free for shops only — individuals 50c. each).

CLOVER MFG. CO., Norwalk, Conn.
- What Are the Various Coated Abrasives?

WM. DIXON, INC., Newark, N. J.
- Dixon Manual and Book of Designs — $1.50.
- Projects in Art Metal, Jewelry and Wrought Iron — 80c.
- Designs with Instructions for Simple Projects in Art Metal and Jewelry — 25c.
- Operations and Processes for Art Metal, Jewelry, and Wrought Iron — 25c.
- Dixon Tool List.

DUMORE CO., Racine, Wis.
- Dumore Tap and Drill Chart.
- The Care and Operation of Portable Precision Lathe Grinders — 25c.

FELLOWS GEAR SHAPER CO., Springfield, Vt.
- The Involute Gear.
- The Internal Gear.

FOSDICK MACHINE TOOL CO., Cincinnati, Ohio.
- Horsepower Required for Drilling Machinery Steel.
- Drilling Time in Minutes.

HANDY AND HARMAN, 82 Fulton St., New York, N. Y.

Handy Flux Bulletin No. 9.
How to Use Silver Solder and Brazing Alloys.

KESTER SOLDER CO., 4257 Wrightwood Ave., Chicago, Ill.
Kester Acid-Filled Plastic.
Rosin-Filled Solders.

KEWANEE BOILER CORP., Kewanee, Ill.
Boilers and Their Products.
Scale for Reading Pipe Sizes.

LEBLOND MACHINE TOOL CO., Cincinnati, Ohio.
Running a Regal.
Wall Chart of Machine Lathe.

LEHIGH STEEL CO., Bethune and Greenwich Sts., New York, N. Y.
Loco, the Nontempering Tool Steel.
Croma Alloy Steel.

LUFKIN RULE CO., Saginaw, Mich.
Chart of U. S. Standard Screw Threads.
General Catalog 12C.

METROPOLITAN LIFE INSURANCE CO., New York, N. Y.
Industrial Education in Schools.

METAL AND THERMIT CORP., 120 Broadway, New York, N. Y.
Thermit Welding.
Murex Welding and Electrode Information Booklet.

MORSE TWIST DRILL AND MACHINE CO., New Bedford, Mass.
Machinist's Practical Guide.

NATIONAL TUBE CO., 208 So. La Salle St., Chicago, Ill.
Pipe Threading Principles.

NIAGARA MACHINE AND TOOL WORKS, 637–697 Northland Ave., Buffalo, N. Y.
Handy Reference Booklet No. 200.
Floor Plans for Sheet Metal Classes — No. 103.

NICHOLSON FILE CO., Providence, R. I.
A File for Every Purpose.

NORTON CO., Worcester, Mass.
Norton Lecture Course.

OLIVER MACHINERY CO., Grand Rapids, Mich.
Installation, Care, and Operation of Oliver Circular Saw Benches.
Installation and Operation of Bench Saws.

PECK, STOW, AND WILCOX CO., Southington, Conn.
SB–35 School Bulletin.

POWER TRANSMISSION COUNCIL, INC., 53–63 Park Row, New York, N. Y.
Lectures on Power Transmission.

RUSSELL, BURDSALL & WARD BOLT AND NUT CO., Port Chester, N. Y.
Common Machine Fasteners (supply is limited).

SMOOTH-ON MFG. CO., 568 Communipaw Ave., Jersey City, N. J.
Smooth-on Handbook.

SOUTH BEND LATHE CO., South Bend, Ind.
How to Become a Machinist — 10c. (chart).
Measuring with Inside Calipers — 10c. (chart).
Decimal Equivalent Fractions of an Inch — 10c. (chart).
Chart Showing How to Lace a Belt — 10c.

STANLEY TOOLS, New Britain, Conn.
Joy of Accomplishment Booklet.
Stanley Tool Catalog.
Expert Soldering Booklet.
Steel Square Booklet.

STERLING WHEELBARROW CO., Milwaukee, Wis.
Sterling Wheelbarrow Foundry Book 49.

U. S. GOVERNMENT PRINTING OFFICE, Superintendent of Documents, Washington, D. C.
Simple Plumbing Repairs in the Home, No. 1460 — 5c.
Farm Plumbing Bulletin, No. 1426 — 5c.
Hoover Plumbing Code, Building and Housing Publication, No. BH-13 — 35c.

UNIVERSAL HANDICRAFTS SERVICE, INC., 1270 Sixth Ave., New York, N. Y.
Manual on Non-firing Clay — 25c.

WARNER AND SWASEY CO., 5701 Carnegie Ave., Cleveland, Ohio.
Instructions for Grinding and Setting Cutters.
Challenge to American Industry.

WHITE METAL ROLLING AND STAMPING CORP., Moultrie and Calyer Sts., Brooklyn, N. Y.
Teaching Aids for Metalwork — 6c.

J. H. WILLIAMS AND CO., Buffalo, N. Y.
How to Select and Use Wrenches, No. A–445.
Superrenches and Supersockets, No. A–409.
Improved Wrenches, No. A–81.
Machinists' Tools, A–431.

Woodworking Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

ABRASIVE CO., Tacony and Fraley Sts., Philadelphia, Pa.
Grinding Wheel Data Books and Safety Code for the Use, Care, and Protection of Abrasive Wheels.
General Purpose Grinding Wheel Folders (10c. charge for more than 1 copy).

AMERICAN LUMBERMAN, 431 Dearborn St., Chicago, Ill.
Touch Wood — 15c.

AMERICAN REEDCRAFT CORP., 130 Beekman St., New York, N. Y.
Reed and Raffia.
Projects in Leathercraft.
Cane Seat Weaving.
Colonial Chair Frames (seat weaving instructions).

AMERICAN SCREW CO., Providence, R. I.
Wood Screw Chart.
Circulars on Phillips Recessed Head Screws.

AMERICAN VOCATIONAL ASSN., INC., 1010 Vermont Ave., N.W., Washington, D. C.
Standards of Attainment in Industrial Arts Teaching — 25c. single copy: 20c. per copy in quantity of 10 or more.

AMERICAN WALNUT MFRS. ASSN., 616 S. Michigan Blvd., Chicago, Ill.
Story of American Walnut
Of Course It's Walnut.
How to Identify Walnut.

APPALACHIAN HARDWOOD MFG. INC., 414 Walnut St., Cincinnati, Ohio.
Appalachian Hardwoods, No. 11.
Protection Through Selection, No. 2.
Chestnut as a Core Wood, No. 4.
Appalachian Beech, Birch and Maple, No. 12.
Appalachian Yellow Poplar, No. 13.

ART INLAYERS, Blocksburg, Calif.
Catalog of Veneers and Inlaying Supplies.
Pamphlet containing veneering with little equipment, complete instructions on simplified inlaying of pictures, etc. — 15c.

E. C. ATKINS AND CO., 402 S. Illinois St., Indianapolis, Ind.
Demonstration Saw Loaned.
Saw Sense.

BEHR-MANNING CORP., Troy, N. Y.
Wall Chart — Industry's Woodworking Abrasives.
Sandpaper, Its How and Why.

CALIFORNIA REDWOOD ASSN., 405 Montgomery St., San Francisco, Calif.
California Redwood Lumber Industry, Durability.
Lumber Letter No. 2.

E. L. BRUCE CO., Memphis, Tenn.
Bruce Hardwood Flooring and Lumber Products.
Terminix Pictorial.

CARBORUNDUM CO., Niagara Falls, N. Y.
Carborundum Brand Products for the Home Craftsman.
Abrasives in Service of Industry No. A–617.
Colored Wall Chart.
Romance of "Carborundum."

CASEIN CO. OF AMERICA, 350 Madison Ave., New York, N. Y.
Casco Projects.
Casco Gluing Chart.
Casco Gluing Guide.
Samples of Glue.
How to Make Veneered Panels, by H. Hjorth — 50c.

CENTURY FURNITURE CO., Grand Rapids, Mich.
Furniture — $1.10.

CHICAGO WHEEL AND MFG. CO., 1101 W. Monroe Street, Chicago, Ill.
Handee Hobbies — 25c. (free when instructor mentions I.A.V.E.).

CLOVER MFG. CO., Norwalk, Conn.
What Are the Various Coated Abrasives?

ALBERT CONSTANTINE AND SON, INC., 797 E. 135th St., New York, N. Y.
Constantine's Master Manual for Woodworkers — 10c.
Fifty Varieties of Veneers — $2.75.

CRAFTSMAN WOOD SERVICE CO., 2727 Mary St., Chicago, Ill.
Hunt's Catalog No. 14 for Woodworkers — 10c. (12 of the pages are in colors).

CYCO MFG. CO., Box 764, Davenport, Iowa.
Home Kraft Furniture — 10c.

DELTA MFG. CO., 600–634 E. Vienna Ave., Milwaukee, Wis.
Making Money with Delta Tools — 10c.
How to Plan a School Work Shop.

DOUGLAS FIR PLYWOOD ASSN., Tacoma, Wash.
Portfolio of Architectural Plates.
Dri-Bilt with Plywood Manual.
Plans for Plywood Rowboats, Sailboats.
Construction Details for Plywood Accessories.
Facts for Finishing Plywood.
Wall Chart of Plywood Grades.

GRAND RAPIDS FIBRE CORD CO., Grand Rapids, Mich.
Art Fibre Furniture Weaving.

HOME CRAFTSMAN MAGAZINE, 115 Worth St., New York, N. Y.
One-Evening Projects — 50c.

IRWIN AUGER BIT CO., Wilmington, Ohio.
How to Select, Use, and Care for Bits.

JOHNS-MANVILLE CO., 22 East 40th St., New York, N. Y.
Insulating Board Brochure.

S. C. JOHNSON AND CO., INC., Racine, Wis.
Handbook of American Trees and Wood Finishing.

KEYSTONE GLUE CO., Williamsport, Pa.
Glue Handbook — 25c.

KLISS MFG. CO., INC., Grand Rapids, Mich.
The Book of Projects — 25c.

KUEMPEL CHIME CLOCK CO., Guttenberg, Iowa.
How Clocks Are Built for Pleasure and Profit — 10c.
Self-Reading Lumber Chart — 10c.
Furniture Idea Book — 10c.

LEPAGE'S, INC., Gloucester, Mass.

Glue Facts.
Do's and Dont's for Gluing.

LUFKIN RULE CO., Saginaw, Mich.
General Catalog 12C.

MAHOGANY ASSN., INC., 75 East Wacker Drive, Chicago, Ill.
How to Identify Genuine Mahogany and Avoid Substitutes.

MAPLE FLOORING MFG. ASSN., 332 S. Michigan Ave., Chicago, Ill.
Color Harmony in Floors.
Leaflet on Hard Maple Flooring.

MASONITE CORP., 111 W. Washington St., Chicago, Ill.
Samples of Products.
Literature on Products and Use in Home.

DAVID MAYDOLE TOOL CORP., Norwich, N. Y.
Captain of Industry (limited supply on hand).

J. H. MONTEATH CO., 202 Lewis St., New York, N. Y.
Story of Balsawood.
Story of Teakwood.
Story of Greenheart.
Story of Lignum Vitae.

MONITE WATERPROOF GLUE CO., Minneapolis, Minn.
Glue of the Ancients Gone Modern.
Crafts Manual (free with purchase of 5 oz. can of Monite economical cold method glue — 25c.).

NATIONAL LUMBER MFRS. ASSN., 1337 Connecticut Ave., Washington, D. C.
The Story of Wood.
Exposing the Termite.
Lumber Literature.

NATIONAL OAK FLOORING MFRS. ASSN., Memphis, Tenn.
New Beauty for Old Homes in Hardwood.
How to Lay and Finish Oak Floors.

NICHOLSON FILE CO., Providence, R. I.
A File for Every Purpose.

NORTHERN HEMLOCK MFG. ASSN., Minneapolis, Minn.
Some Things Home Builders Should Know.
Vital Factors of Building Construction.

OLIVER MACHINERY CO., Grand Rapids, Mich.
Installation, Care, and Operation of Oliver Circular Saw Benches.
Installation and Operation of Bench Saws.

FRANK PAXTON LUMBER CO., Kansas City, Kans.
Philippine Mahogany Circulars.

H. H. PERKINS CO., 256 Shelton Ave., New Haven, Conn.
Reedcraft.
Instructions in Methods of Seat Weaving.
Price List of Chair Seating Materials.

PLATE GLASS MFRS. OF AMERICA, Pittsburgh Pa.
Plate Glass Booklet.

PORTER-CABLE MACHINE CO., Syracuse, N. Y.
Take-About Sander Abrasive Chart.

ROGERS ISINGLASS & GLUE CO., Gloucester, Mass.
The Rogers Book of Woodworking Shop Notes.

SAVOGRAN CO., India Wharf, Boston, Mass.
How to Repair and Refinish Furniture.

SIMONDS SAW AND STEEL CO., Fitchburg, Mass.
How to File a Crosscut Saw.
Methods of Cutting Metals.
File Facts.
Hacksawology.

SKILSAW, INC., 5031 Elston Ave., Chicago, Ill.
How to Cut Costs on Small Homes.

SOSS MFG. CO., 21777 Hoover Road, Detroit, Mich.
How to Obtain Beautiful Effects.

SOUTHERN HARDWOOD PRODUCERS, INC., Memphis, Tenn.
Southern Hardwood Interiors.

STANLEY TOOLS, New Britain, Conn.
Expert Soldering Booklet.
Steel Square Booklet.

TILE-TEX CO., Chicago Heights, Ill.
Floors that Endure.
Decorative Walls.
Flexachrome.

WESTERN PINE ASSN., Yeon Bldg., Portland, Ore.
Wood Carving for Pleasure.
Plan Book for the Boy Builder.

Wood-Finishing Division

It is advisable that teachers use school stationery when writing for any of these items.

In the list which follows, all items are free unless otherwise noted. In most cases a small charge is made when "free" items are ordered in quantity.

ALUMINUM CO. OF AMERICA, Pittsburgh, Pa.
Aluminum Paint Manual.
Finishes for Aluminum.

CHICAGO TRIBUNE, Chicago, Ill.
Refinishing Furniture — 7c. postpaid.

GRAND RAPIDS WOOD FINISHING CO., Grand Rapids, Mich.
Better Wood Finishing.

S. C. JOHNSON AND CO., INC., Racine, Wis.
Handbook of American Trees and Wood Finishing.

NATIONAL PAINT, VARNISH, AND LACQUER ASSN., 1500 Rhode Island Ave., N.W., Washington, D. C.
Why Paint Peels.
New Paint, Varnish, and Lacquer Catechism.

PLATE GLASS MFRS. OF AMERICA, Pittsburgh, Pa.
Plate Glass Booklet.

SAVOGRAN CO., India Wharf, Boston, Mass.
How to Repair and Refinish Furniture.

U. S. DEPT. OF AGRICULTURE, Forest Service, Forest Products Laboratory.
Artificial Resin Glues for Plywood.
Casein Glues: Their Manufacture, Preparation and Application.

U. S. DEPT. OF COMMERCE, National Bureau of Standards.
Outside House Painting, No. LC603.
Paint, Varnishes, and Related Products, No. LC574.

WILLIAM ZINSSER & Co., 516 W. 59th St., New York, N. Y.
Story of Shellac.

Films

The films listed are 16 millimeter silent and sound and, in most cases, may be secured free of charge. Transportation charges must be assumed by the school or visualization department. Railway Express allows the return of packages to sender at half rate. Call the agent's attention to the fact that it is a return shipment. Films should be ordered six weeks or more in advance and several choices of dates or weeks should be submitted with all requests.

The letter which appears before each of the films listed shows the division of industrial arts and vocational education for which they are particularly suited. The following list shows the divisions for which these letters were chosen:

A — Agriculture
B — Home Economics
C — Electricity
D — Transportation
E — Telephone and Radio
F — Automotive
G — Health and Hygiene
H — Metalworking
I — Machine Operation
J — Abrasives
K — Electric Welding
L — Gas Welding
M — Recreation
N — Printing
O — Art and Drafting
P — Safety
Q — Science, Physics, and Chemistry
R — Social Science and Economics
S — Woodworking
T — Aviation

REQUEST FOR VISUAL AIDS

Date_____

Dear Sir: Please send me the following visual aids for school use:

Teaching Materials

Sample	Booklet		
Chart	Copy		

Films

	Free	Rental	Will Assume Trans-Charges
16 m. m. silent			
silent			
16 m. m. sound			
sound			

School _____
Address _____
City and State _____
Title-Name _____

H — Steel for the Ages — 35 min. — Sound — Free
Allegheny Ludlum Steel Corp., 2319 Oliver Bldg., Pittsburgh, Pa.

S — Cementing the Centuries — 2 reels 16mm. 2 reels 35mm. — Silent — Free east of Mississippi and states bordering west of Mississippi
Alpha Portland Cement Co., 15 South Third St., Easton, Pa.

H — Aluminum Fabricating — 20 min. — Sound — Free
H — Aluminum, Mine to Metal — 20 min. — Sound — Free
Aluminum Co. of America, Pittsburgh, Pa.

M — Flagships of the Air — 25 min. — Sound — Free
M — Caravans of the Sky — 15 min. — Sound — Free
American Airlines, Inc., 735 N. Water St., Milwaukee, Wis.

H — From Mine to Consumer 30 min. Silent Free
16mm.
American Brass Co., Waterbury, Conn.

M — Alaska's Silver Millions 16mm. Sound & Silent Free
M — Jerry Pulls the Strings 16mm. Sound Free
(Story of coffee)
American Can Co., 230 Park Ave., New York, N. Y.

M — Wake up America 12 min. Sound Rental—$2.00 per day
16mm. For sale—$15.00
American Films Foundation, 2280 Holly Drive, Hollywood, Calif.

H — The Backbone of Progress 2 reels Silent Free
16mm.

H — Steel 2 reels Sound Free
16mm.

H — Bridging San Francisco Bay 4 reels Sound Free
16mm.

H — Bridging Marble Canyon 1 reel Sound Free
16mm.
American Institute of Steel Construction, Inc., 101 Park Ave., New York, N. Y.

H — Steel-A Symphony of Industry Free
American Iron and Steel Institute, 350 Fifth Ave., New York, N. Y.

M — Touching All Bases — 1940 20 min. Sound Free

M — Batting Around the American League, 1941 40 min. Sound Free
American League of Professional Baseball Clubs, 310 South Michigan Bldg., Chicago, Ill.

H — The Continous Process of Making Iron and Steel Sheets 20 min. Silent Free

H — Romance of Iron and Steel 20 min. Sound Free
American Rolling Mill Co., Pittsburgh, Pa.

Q — Rayon — A New Frontier of Progress 16mm. Sound Free
American Viscose Corp., 350 Fifth Avenue, New York, N. Y.

O — Silk Screen Process 15 min. Silent $1.50
N — The Monotype 15 min. Silent 1.50
S — Essentials of Wood Turning 15 min. Silent 1.00
Sound 1.50
Elementary Bookbinding 15 min. Silent 1.50
Bell and Howell Co., 1801–15 Larchmont Ave., Chicago, Ill.

S — Behind the P & H Brand 20 min. Sound or Silent Free
Ray Bell Films, Inc., 821 University Ave., St. Paul, Minn.

J — Spark Plugs in Aviation 3 reels Sound Rental
T — U. S. Coast Guard Academy 2 reels Sound Rental—$2.00
J — Youth Takes to Wings 6 reels Sound Rental
Bray Pictures Corp., 729 Seventh Ave., New York, N. Y.

S — Carborundum 30 min. Silent Free
Carborundum Co., Niagara Falls, N. Y.

M — On to Washington 20 min. Sound Free
Castle Films, RCA Building, New York, N. Y.

M — George Washington's Railroad 60 min. Sound Free
Chesapeake and Ohio Lines, Terminal Tower, Cleveland, Ohio.

R — King Cotton 17 min. Sound Free
R — Sand and Flame 19 min. Sound Free
P — A Safe Day 9 min. Sound Free
Chevrolet Motor Division, General Motors.

F — Army on Wheels 30 min. Sound Free
F — Years of Progress 40 min. Sound Free
F — Highway Bound 12 min. Sound Free
F — The Chance to Lose 12 min. Sound Free
F — Fluid Drive 12 min. Sound Free
Chrysler Corp., Dodge Division, Detroit, Mich.

M — First Chair (Musical Instruments) 37 min. Sound Free
C. G. Conn Co., Ltd., Elkhart, Ind.

And So We Make an Extension Table 40 min. Silent
Albert Constantine, 797 E. 135th, New York, N. Y.

M — Culver Woodcrafters 1 reel Sound Free
M — Naval and Cavalry 1 reel Sound Free
Culver Military Academy, Culver, Ind.

P — Bicycling with Safety 10 min. Sound Free
P — On Two Wheels 10 min. Sound Free
Cycle Trades of America, Chanin Bldg., New York, N. Y.

S — Woodworking 15 min. Sound Free
DeWalt Products Corp., Lancaster, Pa.

Q — New World Through Chemistry 20 min. Sound Free

Q — Are We Painters 35 min. Sound Free
Q — The Story of Neoprene 20 min. Sound Free
E. I. DuPont Nemours and Co., Wilmington, Del.

H — Iron Mining and Manufacture 16 min. Silent Rental—$1.25
Educational Film Service, 77 Woolnough Avenue, Battle Creek, Mich.

P — Care of Minor Wounds ¼ reel Sale—$6.00
Eastman Kodak Co., Rochester, N. Y.

Fish from Hell 30 min. Silent or Sound $3.00
Eastman Kodascope Library, 606 Wood Street, Pittsburgh, Pa.

A — Cane Sugar 1 reel Sound Rental—$2.00
S — Lumbering 1 reel Sound Rental— 2.00

C — Principles of Current Generation 20 min. Silent Rental
Edited Pictures System, 330 West 42nd St., New York, N. Y.

F — Auto-Lite on Parade 20 min. Sound Free
Electric Auto-Lite Co., Toledo, Ohio.

P — Handlebar Hazards (colored) 20 min. Silent Free
Employers Mutual Liability Insurance Co. of Wisconsin, Wausau, Wis.

D — National Park Road Building 62 frames Free

P — Highways to Fit the Traffic 69 frames Free
Federal Works Agency, Public Roads Administration, Washington, D. C.

G — Drinking Health 20 min. Silent Free
P — Speaking of Safety 15 min. Silent Rental
R — Modern Rug and Carpet Making 15 min. Sound Free

P — Bicycling with Complete Safety 11 min. Sound Free

M — This Amazing America (technic.) 36 min. Sound Free
Films of Commerce Co., 21 West 46th St., New York, N. Y.

P — Speedway Tested for Highway Safety 25 min. Sound Free
Firestone Tire and Rubber Co., Firestone Park, Akron, Ohio.

M — First Century of Baseball 42 min. Sound Free

M — This Moving World 26 min. Sound Free
Fisher Body Division, General Motors Corp., Detroit, Mich.

F — Designed for Power 40 min. Sound Free in southwestern Pennsylvania only.
M — News in the Air 22 min. Sound
R — Bringing the World to the Classroom 25 min. Sound
J. E. Foss, 501 Market St., Pittsburgh, Pa.

E — Television 10 min. Sound Free
E — Air Waves 10 min. Sound Free
M — Home Defense 20 min. Sound Free
M — Footsteps 10 min. Sound Free
R — Why Not Live 10 min. Sound Free
N — Bound to Last 15 min. Sound Free
M — Mobilized for Mercy 10 min. Silent or Sound Free
M — Marching with Old Glory 10 min. Silent or Sound Free
Wm. J. Ganz Co., 19 East 47th St., New York, N. Y.

M — Along the Great Silk Route 30 min. Sound Free

F — Diesel, the Modern Power 23 min. Sound Free

F — Frontiers of the Future 11 min. Sound Free
M — Futurama 10 min. Sound Free
M — Lest We Forget 10 min. Sound Free
F — Modes and Motors 9 min. Sound Free
F — Wheels for Defense 10 min. Sound Free
I — Wings for Defense 9 min. Sound Free
P — The Other Fellow 9 min. Sound Free
P — We Drivers 10 min. Silent or Sound Free

General Motors Corp., Dept. of Public Relations, 1775 Broadway, New York, N. Y.

N — A Short Course in Paper Making	30 min.	Sound	Free

P. H. Glatfelder Co., Spring Grove, Pa.

F — The Story of the Tire	30 min.	Silent	Free
R — Men in the Making	15 min.	Silent	Free
A — Conquering the Jungle	15 min.	Silent	Free

Goodyear Tire and Rubber Co., Akron, Ohio.

M — Yesterday, Today, and Tomorrow	32 min.	Sound	Free

H. J. Heinz Co., Pittsburgh, Pa.

S — From Trees to Lumber	1 reel	Sound	Free
M — Building of Boulder Dam	1 reel	Sound	Free

International Harvester Co., 180 North Michigan Ave., Chicago, Ill.

N — Sutherland Paper	20 min.	Sound	Free

Kalamazoo Parchment Co., Parchment, Mich.

I — Rotary Head Tool and Die Milling Machine	20 min.	Silent & Sound	Free

Kearney and Trecker Corp., Milwaukee, Wis.

L — Flame Hardening	16mm.	Silent	Free
L — Hard-Facing — A Key to Modern Industrial Efficiency	16mm.	Silent	Free
L — Oxwelded Industrial Piping	16mm.	Silent	Free
L — Oxwelding for Profit, Part I and Part II	16mm.	Silent	Free

Linde Air Products Co., 30 East 42nd St., New York, N. Y.

S — Masterpieces in Mahogany	30 min.	Silent	Free
S — Romance of Mahogany	45 & 30 min.	Silent	Free

Mahogany Assn., Inc., 75 East Wacker Drive, Chicago, Ill.

M — Youth Looks Ahead	26 min. 16mm.	Silent	

Melville Shoe Corp., 25 West 43rd St., New York, N. Y.

M — America, Yesterday, Today and Tomorrow	10 min.	Sound	Free
R — Frontiers of the Future	10 min.	Sound	Free
M — Men and Machines	10 min.	Silent or Sound	Free
M — America Marching On	10 min.	Silent or Sound	Free
R — Your Town — A Story of America	10 min.	Sound	Free

National Assn. of Manufacturers, 14 West 49th St., New York, N. Y.

G — Sanitation and the Rural Home	15 min.	Sound	$3.00
	25 min.	Silent	1.50

National Motion Picture Co., Indianapolis, Ind.

G — Preventing Blindness and Saving Sight	30 min.	Silent	Free
	15 min.	Silent	Free
G — The Eyes Have It	20 min.	Sound (slide film)	Free

National Society for the Prevention of Blindness, 1790 Broadway, New York, N. Y.

R — Fifty-two Pay Checks Each Year	25 min.	Sound	Free

Nunn-Bush Shoe Company, Milwaukee, Wis.

E — Rubber Insulated Cables	22 min.	Sound	Free
E — The Oilostatic System	30 min.	Silent	Free

Okonite Co., 501 — 5th Avenue, New York, N. Y.

F — HydraMatic Drive	20 min.	Sound	Free

Oldsmobile, 404 N. Craig St., Pittsburgh, Pa.

E — Radio and Television	10 min.	Sound	$2.00
G — Digestion	10 min.	Silent	1.00
G — Digestion of Foods	10 min.	Sound	2.00
G — General Personal Hygiene	10 min.	Silent	1.50
G — Clothing	10 min.	Sound	1.50
G — Dashes, Hurdles and Relays	20 min.	Sound	3.00
G — Jumps and Pole Vault	10 min.	Sound	2.00
M — Washington, the Capitol City	10 min.	Silent	1.00
M — Abraham Lincoln	20 min.	Silent	2.00
M — The Presidents of the United States	10 min.	Sound	1.50
M — Winning Independence	10 min.	Silent	1.00
M — Building the Nation	10 min.	Silent	1.00
M — Let's Go Skiing	10 min.	Sound	Free
M — Return of the Buffalo	10 min.	Sound	Free
M — Snowtime in the Rockies	10 min.	Silent	Free
N — From Trees to Newspaper	10 min.	Silent	1.00
N — From Trees to Tribune	30 min.	Sound	Free
N — Cover to Cover	20 min.	Sound	2.00
Q — Energy and Its Transformations	10 min.	Sound	2.00
Q — Fundamentals of Acoustics	10 min.	Sound	2.00
Q — Ground Water	10 min.	Sound	2.00
Q — In Nature's Workshop	10 min.	Sound	2.00
Q — Oxidation and Reduction	10 min.	Sound	2.00
Q — Simple Machines	10 min.	Silent	1.00
Q — The Solar Family	10 min.	Sound	2.00
Q — Sound Waves and Their Sources	10 min.	Sound	2.00
Q — The Work of Rivers	10 min.	Sound	2.00
R — Panama Canal	20 min.	Silent	1.00
R — Building the Nation	10 min.	Silent	1.00
R — Your Life Work	20 min.	Sound	3.50
S — The Woodworker	10 min.	Sound	2.00
Q — Electro Chemistry	10 min.	Sound	2.00
Q — Electrons	10 min.	Sound	2.00
Q — Molecular Theory of Matter	10 min.	Sound	2.00

Pennsylvania College for Women, Pittsburgh, Pa.

R — Facts Behind the News	37 min.	Sound	Free

Pennzoil Co., Oil City, Pa.

M — Story of Lincoln Tunnel	10 min.	Silent or Sound	Free in N. Y. & N. J.
R — Conquest of the Hudson	20 min.	Silent or Sound	Free in N. Y. & N. J.
H — Construction of George Washington Bridge	10 min.	Silent	Free in N. Y. & N. J. (Elsewhere rental charge of $1.25 per reel.)

Port of New York Authority, 111 — 8th Avenue, New York, N. Y.

H — This Changing World	9 min.	Sound	Free
H — Nickel Mining	18 min.	Sound	Free
H — Nickel Milling and Smelting	18 min.	Sound	Free
H — Nickel Highlights	40 min.	Sound	Free
H — Nickel Refining	9 min.	Sound	Free
R — Heritage	9 min.	Sound	Free
H — Copper Refining	6 min.	Sound	Free

Douglas D. Rothacker, 729 Seventh Ave., New York, N. Y.

N — Lithographing	40 min.	Silent (colored)	Free

Harris Seybold Potter Co., 343 South Dearborn St., Chicago, Ill.

R — Your Job — Are You Preparing for It?	Picturol filmslides	$2.00
H — Metal Trades as a Career	Picturol filmslides	2.00
H — Careers in Building Trades	Picturol filmslides	2.00
H — Aluminum	Picturol filmslides	2.00
N — Trip Through a Paper Mill	Picturol filmslides	1.00
S — Brick and Stone Masonry	Filmstrip	
S — Cabinetmaking	Filmstrip	
S — Carpentry	Filmstrip	
W — Cement Finisher	Filmstrip	
K — Electrical Workers	Filmstrip	
W — Painters and Decorators	Filmstrip	
S — Plasterers	Filmstrip	
H — Plumbers and Steam Fitters	Filmstrip	
H — Structural Steel Workers	Filmstrip	
F — Auto Mechanics, Part I & II	Filmstrip	
R — Highway Jobs	Filmstrip	
I — Machine Shop Mechanics	Filmstrip	

(Continued on page 282)

The Texture of Toil

DEAN M. SCHWEICKHARD*

A Scale of Quality

During the decade just passed when employment opportunities were meager and the quest for a job often proved fruitless, three youthful brothers launched forth in a business enterprise of their own. In the face of dull conditions even for competitors of long standing, they attempted the establishment of an industrial plant for the manufacture of high-grade machine tools. Their limitations were many and the obstacles often difficult to surmount, but they wove into their undertaking certain indispensable elements upon which it has been able to survive and expand.

First of all, they recognized that their combined success depended upon the faithful and unrelenting toil of each. They realized further that progress could be made most readily and surely if the various tasks and functions to be performed were divided among them in order that each might concentrate upon his own particular duties. Accordingly, one took charge of business affairs, one engineering design, and one managed the shop. From a very small beginning they have grown in the space of a few years to the point of employing considerable numbers of men, and to manufacturing machine tools of sufficient quality to be in demand throughout the nation and in foreign countries.

The secret of the stability upon which they have built was inadvertently revealed in a trip through their shops recently. The purpose of the trip was to follow the line of production involved in the manufacture of a surface grinder and to observe its performance when finished. One of the processes of manufacture had to do with the hand fitting of certain ways essential to the accurate operation of the machine. The workmen colored, scraped, and fitted until a uniformly distributed pattern indicated the desired amount of contact surface.

In the final demonstration of the machine's operation, account was taken of smoothness and freedom from vibration, but the measure of its actual service was taken from the texture of the steel surface which had been ground. Minute examination showed perfect uniformity with no variations from the longitudinal or transverse travel of the grinding wheel. The inspection of that piece of steel was a means of determining the perfection of the machine's performance and of judging the fineness of co-ordination between one part of the mechanism and another. It was likewise a vivid reminder of the scores of instances in which the work of human beings must be co-ordinated if the most satisfactory results are to be secured.

*Assistant Superintendent of Schools, Minneapolis, Minn.

Numerous Ramifications

The realization that there may be texture in things as widely separated as steel plates and human relationships leads one to look about for further evidences of the same characteristic. The thing most commonly thought of as possessing texture is cloth or fabric of some sort such as silk, rayon, nylon, cotton, or wool. A work of art is often judged partially from the standpoint of its texture, whether produced in pen, pencil, crayon, oil, or water color. The texture of a painted or varnished surface varies considerably, depending upon whether it is rough or smooth, glossy or dull, even or uneven, or upon other qualities of sight or touch. Even the quality of a musical tone may be said to be desirable or undesirable in the extent to which it possesses or lacks a certain perhaps indefinable texture.

Rather strangely, all these things are in one way or another the outcome of human toil, and a little inquiry brings forth the fact that the two words, *texture* and *toil,* may be traced back to some common meanings or implications. An early but now rather rare usage of *toil* carries the meaning of a cloth, a canvas, or a web. Other meanings are those more commonly used to express accomplishment, as a result of labor, to struggle, to labor, to exert effort, or to suffer travail. The most common meaning of *texture* is identical with the rarest meaning of *toil,* but in some of its deeper meanings it carries a strong implication of relationships or the manner in which constituent elements are combined to form a whole.

Toil is too frequently thought of as something to be shunned if possible, but such an attitude is shortsighted in that it comprehends toil only in its unpleasant aspects. A brief glance at one's own experience is sufficient to show that toil under varying circumstances may be either pleasant or unpleasant; it may be either physical or mental or often a combination of the two; and the toiler may be wholehearted or listless depending upon the purpose of his toil as conceived in his own mind.

In any case, toil involves the expenditure of human energy; but, whether that energy comes entirely from the mental and physical powers of one individual or many, the forces must pull together if the best results are to be obtained. The breakdown of an individual, of an industry, or of society comes from a conflict of forces within, but individual or social strength arises from a sound state of corporate integrity. Under most circumstances toil carries with it the hope or expectation of some sort of reward. In its lowest form the goal sought may be nothing more than release from the toil when the task is finished, but more commonly it takes such forms as: the accomplishment of a purpose considered worth while; the satisfaction of a task well done; or financial remuneration with which to purchase the necessities or luxuries of life.

Most people toil for different rewards at different times. The mountain climber's reward is reaching the peak; the hunter's reward is bagging the game; the craftsman's reward lies chiefly in the perfection of his craft; and the greatest reward which can come to a parent for his toil is the satisfactory growth and development of his child. Anything of real value cannot be acquired, attained, or enjoyed without toil on the part of someone. Precious minerals must be mined through toil; homes, stores, offices, and shops are built and kept in order through toil; hours of toil produce music, art, literature, and sculpture; even the apparently effortless income derived from an endowment or a bequest comes because someone toiled to provide it.

Refining the Fabric

Manufacturers of textiles know that their products must stand up under varied and rigorous tests if they are to survive. Under varying conditions, they are put to the tests of wear, acid, fire, water, and bright sunlight. The intricate texture of human affairs woven out of the fibers spun from the toil of human hands and minds must likewise withstand a multiplicity of severe tests if it is to last.

The *jack of all trades* is a spasmodic toiler who attempts to do a great many things without doing any of them very well. The net result of his efforts is a mediocre product fabricated of very ordinary threads. The *master* of a single line spins a thread of such excellent quality that when combined with other threads of similar quality from the hands of other experts a fabric of supreme quality is produced.

Any discussion of the relationships between labor and management raises the question as to where one ends and the other begins. Everyone toils who puts conscientious effort into his undertaking and the whole cause is served best when each performs his own function well. Anyone responsible for supervising, directing, or managing the work of others must assume the role of the master weaver who comprehends the entire pattern to be produced by interlacing the warp of one man's toil with the yarn spun by another.

The texture of men's toil is of inferior quality if as in shoddy cloth it is woven of reclaimed fibers which have already served

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION
John J. Metz, Editor

A Few Thoughts for the Opening Class

On the opening day of the school year, the teacher is frequently confronted by an entirely new group of students. He knows, and so do they, that for a semester or probably an entire school year the teacher-student relationship will bring them into close contact day after day, or at least several times each week.

This teacher-student relationship is frequently quite enjoyable to both teacher and student. At times, however, it is just the opposite. Some teachers have the knack of getting the good will of their students right from the start, others are confronted by a belligerent student attitude throughout the year.

The first day of school is none too soon to start laying the foundation for an amiable relationship between the teacher and his students. It should be the outgrowth of a feeling of friendliness which the teacher has toward members of his new class. It is he who must establish this feeling of good will if he wants to engender it in his students.

Probably the readers can think back to their own school days and recall some teacher or professor who lost his standing with them practically on the first day of school. The writer can remember one who lectured in a particularly difficult engineering subject. This man spent the first hour telling the student body how difficult the subject was which they were starting, how strict he was in marking, and how many of his students he failed each year. Most of the students feared this man; a few of the superior students despised him, and the balance took great delight in making fun of him, and in creating disturbances during his lecture periods.

In establishing a friendly feeling between the class and himself, the teacher must be careful not to show any weakness. The students must feel that the instructor wants their friendship because he feels friendly toward them, not because he is afraid of them. Students will be students and will try out the teacher. They will quickly discern any bogus sentiments which their new instructor may display.

It is well, also, to use at least a part of the first hour to give the student an overview of the work upon which he is starting. His interest may be definitely aroused at this time if he is introduced to the romance rather than the drudgery of the journey which he is about to begin along the highway which leads through a certain phase of human knowledge. Of course, there is no need of hiding from him the difficulties which he will encounter. These may well be presented so that they will seem like worth-while obstacles which should be sought out rather than avoided.

Then, too, the student should be thoroughly enlightened as to what the course should do for him. Unfortunately, the necessity of doing this is so often forgotten, and while the teacher may know why he is teaching certain things, the students are frequently left entirely in the dark, or they may at best get but a vague idea why they are asked to do certain types of work.

Another thing that must be remembered is that education, and that means every phase of it, must aim to train the student for life. Some contend that the student, being young, must be taught to live his life at the age at which he is. That is no doubt true, but that idea does not, and must not preclude the proposition that the student must also be trained for an adult life toward which time is inexorably projecting him, and in which he must know and be able to do those things which will produce his future well-being and happiness, and which will help him to do his part in producing the well-being and happiness of those with whom he must associate.

Considering the many implications which are contained in the few statements just made, it is well for every instructor of industrial arts and vocational education to give careful thought and study to the preparation for his first meeting with his students in the school year 1941–42.

Safety in the School Shop

The need for skilled workers was disclosed with startling clarity just as soon as the National Defense Program was put into action. Because of this extreme need for men possessing specific skills, school shops the country over are now engaged in the herculean task of hurriedly imparting limited specific skills to immense numbers of men, who, because of this training, find ready acceptance in the industrial plants where defense work is carried on.

Work done in unusual haste is always more or less wasteful. Had the industrial-arts work of the past been sufficiently diversified, and had it been given in such a manner that the students would have acquired at least a modicum of skill in the handling of hand and power tools, and in using a number of different types of material, much of this elementary training would not now have to be so sharply emphasized.

It might also be said that if the schools had been allowed, in the past ten or more years, to expand their offerings of shopwork on the industrial-arts part- and full-time vocational- and adult-education levels, as needs became more and more apparent, America would now be in a much better position to furnish the skilled workers that are so much in demand.

The fact, however, remains that the lack of skilled men for defense industries is acute, and it is highly commendable that the schools were able, so quickly, to turn over space, equipment, and teachers to the task of training men for the defense industries.

The instructors engaged in teaching these workers should not forget, however, that one of the most vital phases of their work should be the inculcation of a safety consciousness which will help their students to acquire safe habits in performing the work for which they are being trained. The safe worker is not only protecting himself, but he also safeguards his fellow workers, and sets them an example which courts emulation.

The shop student will not acquire safe habits by himself. He must be taught safety as a part of everything he does in connection with the work for which he is being trained. He must be made to recognize that his observance of the safety rules is as necessary as is the vigilance of the soldiers who stand guard in the first-line trenches. He must be taught that skill alone is of little avail, if safe habits of work do not accompany that skill.

H — Molding and Core-making	Filmstrip		
S — Patternmaking	Filmstrip		
H — Sheet Metal Work	Filmstrip		

Society for Visual Education, Inc., 100 East Ohio St., Chicago, Ill.

M — The Story of Leather	2 reels	Silent	Free
	1 reel	Sound	Free

Tanners Council of America, 100 Gold St., New York, N. Y.

TVA	20 min.	Sound	Free

Tennessee Valley Authority, Knoxville, Tenn.

S — Hidden Enemies (Termites)	20 min.	Sound	Free

Terminix Co. of Pittsburgh, Pittsburgh, Pa.

Q — Approved by the Underwriters	42 min.	Sound	Free

Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, Ill.

S — Blessings of Grass	2 reels	Sound	Free
S — Block That Termite	2 reels	Sound	Free
Coast to Coast by Plane	25 min.	Silent	

United Air Lines, 221 N. La Salle St., Chicago, Ill.

S — Four Thousand Gifts to the Forest	1 reel	Sound	Free

U. S. Dept. of Agriculture, Visual Instruction and Editorial Section, Division of Extension Information, Washington, D. C.

C — The Story of a Storage Battery	30 min.	Silent	Free
F — The Power Within	30 min.	Silent	Free
F — The Story of a Spark Plug	30 min.	Silent	Free
F — Automobile Lubrication	15 min.	Silent	Free
F — The Story of Gasoline	30 min.	Silent	Free
F — Making a V-Type Engine	30 min.	Silent	Free
F — Carbon Monoxide Unseen Danger	15 min.	Silent	Free
F — Follow the White Traffic Marker	15 min.	Silent	Free
F — Safety Glass	30 min.	Silent	Free
H — Aluminum, Mine to Metal	30 min.	Silent	Free
H — Aluminum, Fabricating Process	30 min.	Silent	Free
H — Valves, Their Manufacture and Uses	30 min.	Silent	Free
H — Copper Smelting	15 min.	Silent	Free
H — Copper Refining	15 min.	Silent	Free
H — Fabrication of Copper	45 min.	Silent	Free
H — Copper Mining in Arizona	45 min.	Silent	Free
H — Alloy Steels	20 min.	Sound	Free
H — Steel — Raw Materials	15 min.	Silent	Free
H — Steel — Making of Steel	15 min.	Silent	Free
H — Steel — Flat Rolled Products	15 min.	Silent	Free
H — Steel — Bars and Structural Shapes	15 min.	Silent	Free
H — Steel — Rails, Wheels, and Axles	15 min.	Silent	Free
H — Steel — Wire and Wire Products	15 min.	Silent	Free
H — Steel — Pipe and Tube Manufacturing	15 min.	Silent	Free
H — Lead Milling, Smelting, and Refining	34 min.	Sound	Free
H — Lead Mining in Southeast, Mo.	33 min.	Sound	Free
H — Arizona, Its Mineral Resources	40 min.	Sound	Free
J — Manufactured Abrasives	30 min.	Silent	Free
J — Manufactured Abrasives	24 min.	Sound	Free
K — Modern Metalworking with the Oxyacetylene Flame	30 min.	Silent	Free
M — Glimpses of Texas	15 min.	Silent	Free
P — Wildwood — the 100 Per Cent Mine	45 min.	Silent	Free
Q — Sulphur	30 min.	Silent	Free
Q — Asbestos	30 min.	Silent	Free
Q — Water Power	30 min.	Silent	Free
Q — From Mountain to Cement Sack	15 min.	Silent	Free
Q — Evolution of the Oil Industry	60 min.	Silent	Free
R — Railroad Transportation	30 min.	Silent	Free
Lubricating Oil, Story of	30 min.	Silent	Free
Construction That Endures	15 min.	Silent	Free
M — Nickel	30 min.	Silent	Free
M — Nickel Mining	16 min.	Sound	Free
M — Nickel Milling & Smelting	17 min.	Sound	Free
M — Nickel Refining	11 min.	Sound	Free
M — Copper Leaching and Concentration	15 min.	Silent	Free

U. S. Dept. of the Interior, Bureau of Mines, Central Experiment Station, 4800 Forbes St., Pittsburgh, Pa.

R — Price of Progress	2 reels	Sound	Free
R — Boulder Dam	4 reels	Sound	Free

U. S. Dept. of the Interior, Division of Information, Washington, D. C.

G — Stop Silicosis	10 min.	Sound	Free

U. S. Dept. of Labor, Division of Labor Standards, Washington, D. C.

M — You Can't Get Away With It	25 min.	Sound	Free

U. S. Federal Bureau of Investigation, Washington, D. C.

M — Sports of Sailormen	10 min.	Silent or Sound	Free
M — Battle Maneuvers	8 min.	Silent or Sound	Free
M — Let's Join the Navy	8 min.	Silent or Sound	Free
M — Making Man-O-Warsmen	20 min.	Silent or Sound	Free
M — Sky Fleets of the Navy	10 min.	Silent or Sound	Free
M — Gray Armada	10 min.	Silent or Sound	Free
M — Fleet Ho!	10 min.	Silent or Sound	Free
M — Sprinkles of Salt	10 min.	Silent or Sound	Free
M — Modern Man-O-Warsmen	20 min.	Sound	Free
M — Gateway to the Pacific	10 min.	Sound	Free
M — Crossroads of the Pacific	10 min.	Sound	Free
M — Navy Wings of Gold	20 min.	Sound	Free
M — Service in Submarines	10 min.	Sound	Free

U. S. Navy Recruiting Station, Old Federal Building, Pittsburgh, Pa.

H — Bridging San Francisco Bay	45 min.	Sound	Free
H — The Making and Shaping of Steel	77 min.	Sound	Free
H — Steel — Man's Servant	40 min.	Sound	Free
H — USS Cor-Ten	20 min.	Sound	Free
H — Flat-Rolled Products	10 min.	Sound	Free

U. S. Steel Corp., 436 Seventh Ave., Pittsburgh, Pa.

R — Know Your Money	18 min.	Sound	Free

Treasury Dept., U. S. Secret Service, Washington, D. C.

N — Photo Engraving	20 min.	Silent	$1.00

University of California Extension Division, 301 California Hall, Berkeley, Calif.

T — Theory of Flight	1 reel	Sound	Free
T — Problems of Flight	1 reel	Sound	Free

University of Chicago, Chicago, Ill.

P — Death Never Takes a Holiday	20 min.	Silent	In Missouri — 35c. Other states 25c additional.
M — Hands		Sound	Free
M — Work Pays America		Sound	Free

University of Missouri, Columbia, Mo.

S — Forest Treasures	25 min.	Sound	Free

Veneer Association, 616 S. Michigan Ave., Chicago, Ill.

E — Voices in Paper	1 reel	Sound	Free
E — The Voice that Science Made	1 reel	Sound	Free
E — Safeguarding the Speechways	2 reels	Sound	Free

Western Electric Co., Motion Picture Bureau, 195 Broadway, New York, N. Y.

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U. S. Training Aviation Ground Crews

EARL MINDERMAN*

Training courses to equip WPA workmen for private jobs as aircraft servicemen now are being conducted in 14 states, and the program will be extended into other states as rapidly as possible.

Developed by the U. S. Office of Education, the Civil Aeronautics Administration and representatives of the aviation industry, the classes ultimately will provide between 5000 and 6000 trained ground servicemen for employment at major air terminals, airports at small cities, and at auxiliary landing fields.

Surveys indicate that the tremendous growth of private air travel, stimulated by the CAB's civilian pilot training program, have made it difficult for airports to obtain qualified service attendants to handle the greatly increased air traffic.

The training program, organized under the direction of Robert W. Hambrook, specialist in aviation education for the United States Office of Education, serves the dual purpose of filling the need for trained aircraft attendants and enabling hundreds of WPA workmen to equip themselves for return to gainful private employment.

Funds of the Work Projects Administration are being used to finance the training program which is cosponsored by the Civil Aeronautics Board and the U. S. Office of Education.

The National Defense Advisory Committee has endorsed the program and the War Department has given its approval to the work because of the need for more aviation ground crews for the increased army air travel which is resulting from the air corps' expansion program.

Training programs are now in progress at airports in Arkansas, Florida, Georgia, Louisiana, Maryland, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, and Texas. Classes in Texas lead in enrollment, with 50 students.

Instructors for the courses are selected by the U. S. Office of Education and only qualified men with previous successful experience in airport work and ground-crew training are given consideration.

No effort will be made to teach the trainees aviation mechanics. Rather they will be schooled to service planes and prepare them for flight in much the same manner that filling-station attendants check and fuel automobiles. This job is more complex, of course, for airplanes, and it requires more expert attention on the part of the ground crews. The WPA trainees will be taught to supply needs of pilots and planes competently and quickly, to keep take-off and landing lanes clear, and to aid in directing airport traffic.

Courses include four major divisions: (1) Guiding pilot and aiding in handling of planes off the ground. (2) Servicing planes. (3) Inspecting and maintaining equipment. (4) Aiding in directing traffic and field operations.

The theory of flight will be taught to the students; facts about internal combustion engines will be imparted; federal, state, and local aviation regulations will be studied; and instruction given in the properties of aircraft fuels and the viscosity of oil.

Training is given in the proper means of swinging propellers, use of fire equipment, first aid, blocking and clearing of planes, handling planes on the ground, parachute care, conveyance of crippled aircraft from air fields, and making preflight line checks.

Instructors also provide training in handling shop equipment and airport facilities and teach the WPA workmen to tie down ships in all kinds of weather.

Aviation engineering and mechanics are not part of the training course, but there is a possibility that some of the trainees may show such aptitude for aircraft work that they may be able to take such courses later. Other opportunities which may open up for the more apt trainees is that of airport administration and management.

The immediate purpose of the courses is to provide competent, trained aircraft-service men, but the larger possibilities for the more qualified WPA workmen are considered.

All of the personnel for the classes is carefully selected. Only about 10 men are permitted in each course. Age limits are 18 to 30 and applicants for the classes are personally selected by the instructors. Almost all of them are high school graduates and many have had some college work. Thus, the trainees being, in a manner of speaking, hand-picked, may prove capable for more exacting tasks in the future.

Added expansion of the training program will depend, in a measure, upon the availability of qualified instructors in the various sections of the country. The courses will be increased, however, as rapidly as practicable.

A number of airline officials and airport managers have stated that they could give immediate employment to men who are trained in ground service work. Officials of the U. S. Office of Education, the Work Projects Administration, and the Civil Aeronautics Administrations are confident that the courses will result in hundreds of men leaving WPA rolls and returning to private employment in the new jobs which are being opened by the expansion of American aviation.

Commenting on the new training program, U. S. Commissioner of Education, John W. Studebaker, said:

"Trained airport ground servicemen will do much to eliminate congestion and danger to life and property in civilian airports. These men will be invaluable in a national emergency."

*Federal Works Agency, Works Projects Administration, Washington, D. C.

VISUAL AIDS

(Continued from page 282)

S — Fabricating the Western Pines	35 min.	Sound	Free
S — Building a Home with Western Pines	20 min.	Sound	Free

Western Pine Association, Yeon Bldg., Portland, Ore.

R — Years of Progress	32 min.	Sound	Free

Wilding Picture Sales Corp., 7635 Grand River Ave., Detroit, Mich.

F — Anti-Freeze — A Story of Research	20 min.	Sound	Free
P-F — Safety's Champions	25 min.	Sound	Free
Q — Romance of Glass	25 min.	Silent or Sound	Free
G — The Pay-off	20 min.	Silent or Sound	Free
G — The Beneficent Reprobate (Alcohol)	30 min.	Sound	Free
N — Day with the Sun	30 min.	Sound	Free
R-Q — The Fourth Kingdom	33 min.	Silent or Sound	Free
S — ABC of Forestry	10 min.	Silent	Free
S — Science Saves the Surface	20 min.	Sound	Free
A — The River	30 min.	Sound	Free
H — Flow (Valves)	40 min.	Sound	Free

YMCA Motion Picture Bureau, 19 So. La Salle St., Chicago, Ill.

Measuring Accomplishments in Cooperative Part-time Training

R. B. McHENRY*

All plans of cooperative part-time work have as an objective the training of youth on the job, plus the giving by the school of technically related and generally related subject content which are necessary to make a trainee efficient in his vocation and as a citizen.

In the larger centers, the cooperative part-time work is usually centered in the leading mechanical industries and distributive places of business. In the smaller centers, the equipment and training of the stores, businesses, and the various technical training stations are utilized. In all communities, the cooperative part-time work provides a minimum of 20 clock hours per week of experience on the job and 10 hours or more in the study of general and technically related subject content. The job training, technically related and general related material are determined by an analysis of the occupational field and through the counsel of the employer, advisory committee, employees, and others in the occupation.

The co-ordinator's activity as related to the cooperative part-time school is twofold: first, he works as an adviser to trainees, training in the shop, business, or laboratory; second, the majority of the co-ordinators spend a portion of each day teaching general and technically related subject material to the trainees in their organized related classes.

*Director, Industrial and Adult Education, Public Schools, Tulsa, Okla.

It is evident that, as far as the student is concerned, the cooperative part-time school contributes to four major accomplishments:

1. The accomplishment of the trainee on the job in the industry, business, office, or laboratory;

2. The accomplishment made by the trainee through his study of technical related subject content;

3. The accomplishment made through the study of organized general related subject content, which is needed to improve the vocational and civic efficiency of the trainee;

4. The accomplishment of the student in developing his attitudes, personality, and character to meet the requirements for efficiency in the particular occupation.

In attempting to prepare some information relative to measuring the accomplishments of trainees in this type of program, I secured, through a questionnaire, the cooperation of approximately 100 co-ordinators who are working in various sized cooperative part-time programs in many states. I asked such questions as: How do you determine definitely the status of the trainee in relation to his knowledge of technically related subject matter? How do you determine definitely the status of the trainee in relation to his knowledge of generally related subject matter? At present, what factual materials do you have which you can point to as showing the gain made by a trainee as resulting from being in your program? What type of rating scales or sheets are you using for employers' rating of trainees?

In studying the answers of the inquiries, I have found that the majority of the co-ordinators are attempting to measure the accomplishments of their trainees, but in almost all cases it is purely subjective measures or objective tests lacking in statistical refinement.

The statements listed in Table I give a summary of some of the procedures reported in use by co-ordinators for measuring the accomplishment of the trainees on the job, in their classwork, and in personality, character, and attitude improvements.

Assuming that the standards for the various occupational fields have been predetermined, and that those standards include manipulative experience, experiences in the application of technical information — those experiences involving the application of auxiliary and general information, the standards of attitudes, character, and personality that are required for the various occupations, it is possible to develop valid, reliable, and statistically correct measuring instruments to measure the trainee's accomplishments. Of course, such tests, if based on job standards and perfected into a standardized group, would need to be developed, utilizing the adapted statistical techniques previously perfected for determining the reliability of tests. Such information has been well presented by W. V. Bingham, L. V. Newkirk, H. A. Greene, J. C. Chapman, and others.

Measures of Job Training	*Measures of Related Study*	*Measures of Attitudes, Personality, and Character*
1. Trade tests.	1. Increase in pay.	1. Increase in pay.
2. Increase in pay.	2. Gainfully employed after graduation.	2. Recognized improvements of trainee in personality, attitudes, and character.
3. The I.C.S. final tests.	3. Ability to hold responsible positions.	3. Gainfully employed after graduation.
4. Gainfully employed.	4. Full-time employment during the summer months.	4. Ability to hold responsible position.
5. Ability to hold responsible positions.	5. Amount of related work trainee does in comparison to others in class.	5. Full-time employment during the summer months.
6. Employed full time during the summer months.	6. By his method of procedure.	6. Statement report from employers.
7. By his method of procedure.	7. Achievement tests.	7. Retention of students in school until the completion of their course.
8. Report statements from employers.	8. Report statements from employers.	8. Rating scales on personality, character, and attitudes.
9. Trainee's continuation on the job after leaving the high school.	9. Opinions of previous trainees.	
10. Progress made by former trainees of the cooperative part-time school as compared to workers entering the same occupation through other routes.		
11. Opinions of previous trainees.		
12. Quality of product produced by the trainee as compared to workers of similar experience.		
13. Sales records.		
14. Spoilage records.		
15. Customer complaints.		

Table I. Measures of Accomplishments of Trainees in the Cooperative Part-Time School Given by Co-ordinators

The existing achievement tests dealing with the various generally related subjects can be used or revised to give a fair degree of accuracy and indication as to whether the general related teacher is accomplishing the objective of the work. In making this statement, such general related subjects as health and safety problems, shop economics, and the like, are considered.

Many trade tests are now used and have been developed as an aid in ascertaining whether a person can do successfully the manipulative, planning, and other phases of the trade. These tests may be oral, consisting of a battery of questions which call for no elaborate replies, but which can be answered in a word by the person who really knows the trade while a novice or apprentice, no matter how intelligent he is, is at a loss. Some trade tests are worked on the basis of tools, operations, and material identifications. Many trade tests are given under the supervision of advisory committees or examining committees, and are of performance type. Few of these tests have been declared statistically valid and reliable.

In further preparation for this program, I contacted a number of employers who are cooperating with the program of cooperative part-time education in the various communities. Some of these people manage furniture factories, welding shops, retail stores, wholesale places of business, printing shops, and the like. My investigation included an attempt to find what measure of accomplishment employers are applying in checking the trainees in their places of business or industries. The statements listed in Table II give a summary of some of the procedures actually in use by employers in their attempt to measure the accomplishments of cooperative part-time trainees.

Many of these measures are in part, or as a whole, subjective in nature. In measuring the quality of production in industrial plants, it is necessary for the employer to have a certain standard of tolerance on which to base his conclusions that a trainee is accomplishing the desired objective, as far as the quality of production is concerned. This standard is generally considered to be that standard of quality that is acceptable for a journeyman in that particular occupation. This standard seems to have no mid-point; the quality is either good or bad. The sales that are made and the articles returned for exchange or refund are considered bad.

In the production line and in the retail stores, the quantity of production or the quantity of sales made can be measured objectively, particularly in those jobs where quota and average sales or production in relation to individuals and departments have been predetermined for the store or a group of stores. Rating scales are the common measurement devices used for determining the gains made in improving personality and character traits. Most co-ordinators are using some type or scale scored by the employer, related subjects teacher, and others. These scales have been developed by first selecting and defining the essential traits required for success in the occupation. Such scales can be developed for the respective trade fields. The standards of all trades should include detailed specification of personality traits essential for success in that occupation. Objectivity in scoring such a scale is only possible after every effort to refine the rating scale has been exhausted. Two procedures are recommended:

1. The normal curve procedure showing a scale with five equal steps for rating each trait. This method should, if used with 100 unselected cases, have a distribution from low to high for the five steps. A scale which is desirable to use will have a five-step rating with a distribution of 7–24–38–24–7.

2. A master scale method is used in situations in which few cases are involved. The traits to be used in the scale are determined as they would be for a normal curve type rating scale. Three or five definite standards of comparison are used. Numerical values for each standard may be adopted. For each of the standards a workman known to the employer or the person rating the trainee is selected. The trainee, as far as personality or character traits are concerned, is compared to the five workmen listed and rated on an equal base with the one of the five having similar personality traits. A suggestive master scale is shown in Table III.

Five Rating Standards	*Names of Persons*	*Adopted Numerical Value*
Excellent	Jack Mills	170
Good	R. Ingle	130
Average	K. Taylor	90
Poor	B. Horton	50
Failure	H. Tobler	10

Table III. Illustration of Master Scale for the Factor of Industry

Headings	*Points*
Personal Appearance	75
Cooperation	50
Customer Service	100
Daily Average Sales	250
Merchandise	200
Cash-Register Operation	100
Observance of Clerks' Rules	100
Counter Appearance	200
Counter Upkeep	150
Understock Upkeep	275
Total	1500

Table IV. Salesclerk Efficiency Check

A subjective measure that is used by most employers in reporting the accomplishment on the part of a trainee is based on the progression from one job training situation to another. This subjective measure is based on the rapidity with which the trainee accomplishes a given job assignment in preparation for another, as compared to other learners in similar situations. It would be difficult to develop statistical measures of this procedure in the modern business and industrial organizations, because of the lack of similarity of ability and experience of the new employee, coupled with the difference in the physical and personal organizations in the training stations.

In those centers where the advisory committee is set up for a particular group of trainees in a single industry or business, oral, manipulative, and written tests are used for rating the accomplishments of a trainee in the training station.

A personnel director in a department store using a number of cooperative part-time trainees was asked to summarize the

Measures of Job Training	*Measures of Related Study*	*Measures of Attitudes, Personality, and Character*
1. Quality of production.	1. Accuracy in following instructions.	1. Rating scales on personality, character, and attitudes.
2. Quality of sales.	2. Efficiency in planning and attacking a job.	
3. Spoilage of production.	3. Ability to learn by experience.	
4. Returned merchandise.		
5. Progress into new and more difficult training positions.		
6. Oral tests.		
7. Written tests.		
8. Manipulative tests.		
9. Scientific mechanical tests.		
10. Housekeeping.		
11. Stockkeeping.		
12. Quantity of production.		

Table II. Measures of Accomplishments of Trainees Through Cooperative Part-Time School As Given by Employers

methods used in measuring accomplishments of trainees. The statements in Table IV are a summary of his plans.

The theory of the oral trade questions is simple. The questions are based on knowledge of trade practice, and, insofar as knowledge and actual skill are highly correlated, such questions will serve as a satisfactory measure of trade skill.

From this discussion of the measurement of accomplishment of the trainees in the cooperative part-time school, it is evident that a program set up to measure in detail the accomplishments of the trainees in the various occupations would be comprehensive and complex. From the predetermined job standards, which I am assuming will include a man's specification setting out those personality, character, and attitude traits that are essential for success in an occupation, it seems that a rating scale based on this specification could be developed that would be valuable and usable in each of the occupations. Such a scale would always be subjective to a certain degree. The existing trade tests of oral, picture, and performance types now in existence will serve as very excellent guides in the development of tests based on job standards.

The experiences of those who are administering the existing trade tests have placed much emphasis on the use of oral tests. These tests could be developed, based on the job standards proposed in this sectional group, and a plan could be developed in each community by which advisory committees and experts in the various occupational fields could, at different intervals, investigate the accomplishments of the trainees in their various trades and occupations by oral tests.

It is possible, I am sure, with definite job standards determined, to establish measuring devices statistically reliable to measure the accomplishment of a trainee in any occupation that can be justified in the cooperative part-time school. It is doubtful whether the critical refinement of such a testing program will be as profitable in our various communities as other things that require the same amount of energy. My brief inspection of the measuring devices now in use with a limited number of co-ordinators and employers leads me to conclude that much experimentation is now being done with the problems of measuring the accomplishments of the part-time trainee, and that the emphasis in relation to measurement should be first directed toward finding the existing measuring devices in use and the refinement of them as far as it is economically desirable.

Further assistance in working out an evaluation program could be given to the co-ordinators and employers through some group like the American Vocational Association, in the form of a detailed plan of procedure for measuring the accomplishments of the trainees. Such a plan would include pertinent information relative to the development of measuring devices, information relative to discovering points or test levels for attainment rating in relation to advancement in the various occupations, the proper analysis of present trade tests in use in relation to measuring the accomplishments in the cooperative part-time program, and the proper interpretation of the results of the measures of accomplishments in relation to the job standards.

General-Shop Teaching

RALPH GALLINGTON*

Occasionally one may hear severe criticisms about the possibilities of making a success of successfully teaching the one-man general shop. Such remarks usually come from persons who themselves are doing poorly, the thing they think is impossible. Their criticism is unquestionably an acknowledgment of ill training or lack of ability. With so many successful general-shop teachers in the field today, it is certain that the job can be done and done very well. One could point out many practices which general-shop teachers must follow in order to become excellent performers in the art. Personal traits have much to do with the results of one's teaching, but there are many points on class organization, management, and guidance which are often completely neglected.

The first meeting of the class is undoubtedly the most important. It is at this time that students form many of the concepts which characterize their actions throughout the remainder of the term. Good teachers realize this and provide for it. Certainly it is poor practice to jump into the course of study without allowing students to look around and get some pleasant impressions regarding their future work in the shop. On the first day you will find the better teacher taking his students on a tour of the shop explaining the different activities which will be presented. Students will be allowed to explore and ask questions; to examine tools and model projects; and in general to have a grand time. This enthusiastic instructor will also explain to the students how they are to rotate through the various units of the shop, gaining experience and making projects in each. Of course, model projects will be on exhibit along with the complete plans for the construction of each. Through this procedure the students will become conscious of the need for plans, patterns, procedures, and the like.

Following the inspection tour the good instructor gives a short unit in blueprint reading. This is offered to the entire class with the aim of teaching the students to read the drawings and blueprints to be used in that particular class. So often it is thought that blueprint reading is a course apart from the shop courses offered to advanced students only. It is being found that in using the correct teaching methods, junior high school students gain a knowledge which enables them to interpret the drawings and blueprint at hand. With the use of a projection box, project models, and some simple blackboard drawing instruments, the instructor demonstrates the simple principles of orthographic projection. Students using ¼-in. graph paper learn to lay out views and make sketches which conform to scale as well as to the orthographic rules. The models used in sketching usually come from the project display in the shop. In this way, students become familiar with the type of projects which are offered later in the shop activities. An ample supply of blueprints, drawings, sketches, patterns, models, and pictures are constantly being used as visual aids.

The blueprint reading unit will, in most instances, be very short. It may start immediately after the inspection tour and continue for the next two or three scheduled periods. The specific aim is to provide the student with the knowledges and skills which will enable him to make drawings and plan procedures for the construction of selected projects within his ability. With this understanding the student is easily motivated into doing the necessary practice work. Only when he has mastered the knowledges and skills will he show any signs of lagging interests. In the case of younger students, it is well to provide some activity for each period during the unit. This may be in the form of putting the shop in order, or work of that nature.

Shortly before the close of the blueprint reading unit, the class should be divided into activity groups. This is done to allow each student time and guidance in the selection and planning of his project. Also, it provides a chance to clinch the learning by direct application. What greater satisfaction can a teacher have than the evidence of a lesson well taught? Before the student leaves the blueprint reading unit he will have sketched his project, made a bill of material, and made some general plans for the completion of the project.

To the student, the general plans for making any project contain few operations. It is unreasonable to expect a junior high school student to remember more than the general procedure. In the construction of shop projects there are seven large units of work as follows:

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1. Cutting out stock.
2. Squaring and shaping of parts.
3. Making necessary joints, holes, etc., for assembly.
4. Preliminary surfacing.
5. Assembly.
6. Final surfacing.
7. Finish.

To the student, these seven jobs remain the same regardless of the project or the activity in many cases. However, the teacher working behind the scenes, so to speak, has selected projects which teach the learning units which have been embodied in the course of study. He has wisely selected in order that students can finish the assigned work in the allotted time. But more important than all, he has selected according to the *interests* of his students. The student may never become conscious of the teacher's plan for teaching the course. To him these seven big jobs are paramount, to the instructor they are merely an opening for teaching and learning.

The course of study is an axiomatic sort of guide followed by all teachers. This is not to say that all teachers follow it with the same zeal and efficiency. Without careful planning, the general-shop teacher may find his teaching drift away from the course of study; it may lack interest for the students; and it may become indicative of complete incompetency.

All plans for teaching should be centered around the student's interests. This interest should serve as a guiding factor in the making of a daily schedule for teaching the various groups. If a given group is interested in and working on the job listed in the table under "Squaring and shaping of parts," the instructor will, of course, plan to give some instruction in this each day until the group moves on to the next job. This instruction will include both the *knows* and the *dos*. No course of study should divorce the related information from the skills, for in so doing the effectiveness is lost entirely. Naturally, the instruction differs in the three grades of the junior high school general-shop program. In each of the seven jobs listed in the table, there are degrees of learning the same as there are degrees of difficulty in the construction of certain projects selected.

Most of the teaching in the general shop is done within the small groups of the class. The instructor's daily plan is made up of several smaller plans, because instead of one class he is actually teaching several. To avoid duplication in the teaching of general operations common to several activities, the teacher often calls the entire class together for demonstrations, explanations, and discussions. These class meetings are also planned at a time when the chances for learning are best. In all group teaching, student participation is emphasized.

In addition to these two methods of group teaching, the excellent teacher is constantly on the lookout for the single student in trouble. Perhaps from a lack of learning in one of the group lessons, he is floundering around on his project getting the most unsatisfactory results. Individual instruction is considered one of the best methods of providing for individual differences. The personal contact afforded by this procedure enables the instructor to analyze the difficulty and to give the necessary encouragement. Group progress should determine the teacher's daily schedule of teaching plans, however.

The question usually asked by inexperienced general-shop teachers is, "How can one plan a procedure for teaching the course of study if at the same time one allows student progress to influence it?" This is undoubtedly one of the hardest things to explain. One teacher said that the secret of his success as a general-shop teacher is the art of leading students to need a lesson at a time convenient to teach it. But he went on to say that a teacher sooner or later comes to realize the importance of anticipating student progress in project making.

The general-shop teachers should become familiar with the levels of learning for the different grades of the general-shop program. He should be able to arrange the teaching topics in their sequential order for presentation. This topical list of teaching units naturally includes both the *knowing* and *doing* items. In preparing the daily lessons the teacher then selects the items from the list of topics according to the progress of the class. Knowing individual differences, he assigns according to abilities and demonstrates according to the intelligence of the students.

In the past it was the practice to break down courses of studies for shop subjects listing the *doing processes* separate from the *knowing units*. This was done merely to provide a graphic picture of the material in relationship to the learning areas, but not to make the material usable as a course of study should be. However, there have been instances when such lists along with certain selected projects comprised the course of study. This is not usable for daily planning. *One must have a course of study which can be followed.* The general-shop teacher should be able to point out where each group in all of his classes is working. The daily or weekly teacher's plan will show this. He should also be able to point out the things each group should know, and what is to be presented next in each of his classes.

The topical list of things to be taught represents nearly as many methods of presentation as there are items on the list. No two units of learning can be presented in the same way. The wide-awake teacher is constantly devising new methods of presenting the units of learning more effectively.

In the final analysis, every teacher will have to work out his own salvation. No two teachers can present lessons or follow courses of studies in the same identical manner. One thing is certain, however. Every teacher will have to make a plan which he can follow. He should not be judged by any other plan than his own, unless his own is failing to get results. One of the slogans commonly found in the school shops reads, "Plan your work; work your plan." No better advice could be given a teacher who is having trouble in the general-shop situation.

THE TEXTURE OF TOIL

(Continued from page 280)

the purpose for which they were intended. It may be inferior likewise if composed of low-grade elements brilliantly colored to simulate superiority. On the contrary that texture will be even and firm: if one makes his own efforts blend with one another through the passing of moments, hours, days, and years; if the efforts of one worker supplement or fit in with those of his contemporaries; and when the skills of one generation are refinements and new developments derived from and built upon the best skills of preceding generations.

It has come to the point where those who toil to weave the firm fabric of democracy are having to band themselves securely together to withstand the dragnet of dictatorship in whose meshes the freedom for honest toil and its rewards would be forever stifled. This fabric of democracy will be woven well and will stand the severe tests to which it is sure to be subjected only as each individual toils willingly where he can serve most satisfactorily and effectively; each hand and mind is trained to the finest skill of which it is capable; and each heart is wholly devoted to the preservation of truth and sincerity.

THINGS TO THINK ABOUT

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The responsibility for learning rests with the individual and his success in learning depends upon his ability, his experience, and his desire to learn.

An individual is the product of his natural endowment plus his experience. We cannot remove the limits placed upon him by his inheritance nor can we create for him, or implant in him, abilities which nature did not give.

One's education is represented by the effect upon him of the sum total of his experiences plus the interpretation he places upon them.

Whatever the character of the education, it usually is associated with purposeful and directed learning although much of our learning is incidental or indirect.

Philosophy seeks to fit together fundamental ideas and experiences in such a manner as to form a pathway to a happy, useful, and successful life. This fitting together of ideas involves a critical examination and wise judgment with respect to beliefs, knowledge, and conduct.

The philosophy of an individual is revealed by his reaction to problems.

Progress on Education for Defense

L. H. DENNIS*

In August, 1940, 55 national organizations from every field of education banded together to form the National Committee on Education and Defense. The purpose of the new committee, sponsored by the American Council on Education and the National Education Association, was to consolidate and develop the educational facilities already enlisted in the defense program. In the year which followed, the direction and intensity of national defense efforts have changed substantially. From a state of "limited emergency" we have moved to "unlimited emergency." Selective service has been adopted and put into practice; increased training and production have been required for the armament and "lease-lend" programs; a start has been made in the mobilization of civilian defense. Because of these and numerous other moves, the National Committee during the year has dealt with an increasingly wide range of important defense problems involving educational activities.

At its first meeting the National Committee on Education and Defense set up simple machinery for operating. It organized an executive committee of 18 members, under the joint chairmanship of George F. Zook, president of the American Council on Education, and Willard E. Givens, executive secretary of the National Education Association. It chose L. H. Dennis, executive secretary of the American Vocational Association, as secretary. The National Committee agreed that its work in so far as possible should be carried on by the organizations of which the Committee is composed, and it defined for itself the following objectives:

1. Immediate and continuous representation of organized education for effective cooperation with the National Defense Council, the Federal Security Agency, and other governmental divisions.
2. Stimulation and co-ordination of the efforts of educational organizations and institutions in projects related to national defense.
3. Dissemination of information regarding defense developments to educational organizations and institutions.
4. Maintenance and improvement of educational opportunities essential in a long-range national program.

Much of the work has been carried on by a series of active subcommittees. The following brief reports indicate the major activities of several subcommittees:

Subcommittee on Military Affairs

Activities in this field antedated the formation of the National Committee on Education and Defense, but this subcommittee has been exceptionally active during the past year. It played an important part in the development of the Selective Service Act, assisted the President's Advisory Committee on Selective Service in the preparation of regulations, and cooperated in the writing of "directives" which defined "necessary occupations." The Senate and House Military Affairs Committees, Selective Service Administration, the War and Navy Departments, the Department of Labor, and other governmental agencies have called on the subcommittee for aid. The committee will soon complete a study of the decisions of local draft boards with respect to occupational deferment of college students. Continuous and effective liaison with 1800 colleges is maintained by conferences and a special bulletin, *Higher Education and the National Defense*, issued periodically by the American Council on Education. More than 27,000 copies of one issue of this bulletin which dealt with occupational deferment procedures were distributed, including copies to all local draft boards at the request of the Selective Service Administration. In February, a national conference, in which more than 450 college presidents from 42 states and leading governmental figures participated, was called by the committee in Washington. The proceedings were published by the American Council on Education under the title, *Organizing Higher Education for National Defense*. A smaller conference in July, 1941, in Washington with governmental officials mapped out a suggested program for cooperation of institutions of higher education in national defense work.

The major share of the committee's time is now given to cooperation with the armed forces in the development of a comprehensive educational program for the camps. With the appointment of eight additional members, the membership is the same as that of the subcommittee on education of the Joint Army and Navy Committee on Welfare and Recreation. On June 18 and 19 this group met with high officers of the War and Navy Departments to map out a program for the camps. Courses of study, library and visual education facilities, and group activities are being planned. Isaiah Bowman, president of Johns Hopkins University, is chairman of the subcommittee. During his absence in South America on a governmental assignment, Harry Woodburn Chase, chancellor of New York University, heads the group. Francis J. Brown, the executive secretary, maintains an office in the War Department as well as on the staff of the American Council on Education.

Subcommittee on Teaching Materials

The lack of materials to assist teachers and students to deal with defense issues, particularly at the secondary school level, created a demand to which the National Committee has responded. A subcommittee was formed which requested the Educational Policies Commission of the National Education Association and the American Association of School Administrators to prepare a series of pamphlets for teachers and high school students on the presentation of certain defense problems in the public schools. Six pamphlets were prepared at a 14-day workshop in Washington of representatives from the public school systems of Baltimore, Cleveland, Detroit, Philadelphia, Pittsburgh, St. Louis, and Washington, with Howard E. Wilson of Harvard University as co-ordinator. Issued in February by the Educational Policies Commission, they are: *Our Democracy, How May We Defend Democracy?, Suggestions for Teaching American History in the Present Emergency, The School — An Arsenal for Democracy, Current Documents on Democracy,* and *How You Can Strengthen Democracy.* Similar pamphlets for college teachers and students are now being outlined. The Subcommittee was recently requested to consider a special series dealing with health, education, recreation, and welfare — four fundamentals in maintaining public morale. Ben G. Graham, superintendent of schools, Pittsburgh, is chairman of the subcommittee.

Subcommittee on Vocational Training

The activities of schools and colleges in training defense workers are an outstanding example of the willingness and ability of education to take its part in the national defense. Under the direction of the United States Office of Education and other governmental agencies, more than a million men and women have been prepared for jobs in the expanding labor market. The National Committee early created a subcommittee to consider the major problems in defense training. In June, eleven recommendations were adopted and transmitted to Aubrey Williams, National Youth Administrator; and John W. Studebaker, Commissioner of Education. These recommendations warn against development of any agencies through federal funds which will parallel or duplicate existing educational facilities. They suggest that the "existing regular educational agencies be adjusted, expanded, and utilized to meet the needs of the times." The statement points to the danger of temporary federally-supported agencies becoming permanent through the creation of "vested interests" both in personnel and physical plant and equipment. A specific recommendation is that "if some federal agencies such as the NYA and the CCC be continued during the period of the

*Secretary-Chairman, Special Committee on Reports.

national defense emergency, these agencies operate within the scope of their original purposes, namely, to provide employment to youth unable otherwise to find employment." Alonzo G. Grace, state superintendent of education of Connecticut, is chairman of this subcommittee.

Subcommittee on Pre-Service Training

With adoption of Selective Service the National Committee considered a plan for local training programs to facilitate the movement of young men to and from military service. The first booklet prepared for the subcommittee, *Is Your Number Up?*, will be issued soon by the Bureau of Publications, Teachers College, Columbia University. A popularly written treatment of questions which selectees ask, this pamphlet will be followed by two others, *Attention! To Your Health*, and one dealing with educational opportunities during service. N. L. Englehardt, Teachers College, Columbia University, is chairman.

Subcommittee on College Women and Defense

Responsibility for national service rests on women to the same degree that it rests on men. The subcommittee in a report urges that colleges point out to young women the need of securing an education which will fit them to carry on their usual work in society while at the same time acquiring skills that are more needed in defense than normally, such as service in health, nutrition, home nursing, business skills, and recreation. The report was published in the bulletin, *Organizing Higher Education for National Defense*. Miss Meta Glass, president of Sweet Briar College, is chairman.

Subcommittee on Latin-American Educational Activities

To assist the Office for Co-ordination of Commercial and Cultural Relations Between the American Republics, this subcommittee was recently organized. It has sponsored the visit of 40 Latin-American scholars to the Eighth International Conference of the New Education Fellowship at Ann Arbor in July and to summer sessions in other institutions. Two hundred and fifty exhibits, including diorama, photographs, books, maps, and other teaching materials, are being prepared for schools and colleges in the United States. Bibliographies and special pamphlets are being developed. Luther H. Gulick, director of the Institute of Public Administration, is chairman.

In addition to the activities of these subcommittees, the Executive Committee has conferred with numerous other governmental agencies including the Treasury Department, the Federal Security Agency, the Office for Civilian Defense, and the National Roster of Scientific and Professional Personnel.

The National Committee on Education and defense has almost completed its first year. One conclusion which was clear at the time of the creation of the National Committee assumed added importance with the passing of time. That is the constant need for emphasis on the obligation of every social institution, including the school, to continue to do its regular job, and if possible to do it better. This is not necessarily a spectacular assignment, but it is basic to national defense broadly conceived. As it enters its second year, the National Committee on Education and Defense, acting through the 60 organizations which now make up its membership, will continue to assist in the constructive development of the defense program, and at the same time will strive for the continued improvement of education.

A Teacher-Rating Scheme

HAROLD M. GRAY*

All individuals in life receive a rating of some kind from some individual, group of individuals, or organization. Teachers have always been graded or rated as excellent, good, fair, or poor teachers according to the kind of work they do.

It is generally believed by those in charge that teachers' characteristics should receive some consideration, as well as the personal requirements for doing a particular job. Since the writer believes that personal characteristics are hard to weigh or grade, he has purposely divided the rating blank into two parts, the one rating the individual requirements and the other the personal characteristics of the teacher being rated. Therefore each should be considered separately, judged, weighed, and assigned the proper rating.

The teacher-rating sheet which follows, is an example of one of the many types of such sheets which could be constructed. This sheet was constructed with the three criteria, reliability, validity, and objectivity, in mind.

Since it is a difficult matter to construct a rating system which answers all three criteria perfectly, it is suggested that the supervisor use one of the sheets to rate the teacher, that the teacher be given one to rate himself, and that the principal also be asked to rate the teacher. A study and a comparison of the three ratings would probably give a result which would be better, and much more accurate than that made by only one individual.

A good rating system may be used as a basis for judging teaching efficiency, for deciding on promotions or demotions, for helping the supervisor find what he can do to aid the individual teacher, and for other similar purposes. In examining a number of rating scales for teachers, it was found

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Individual Requirements	Wght.	Personal Characteristics	Wght.
Organization		Cooperation	
Quantity		Honesty	
Quality		Enthusiasm	
Problems Solved		Sympathy	
Effort		Tact	
Recitation		Promptness	
Demonstrations		Foresight	
Material Used		Helpfulness	
Skill & Dexterity		Humor	
Definite Plans		Poise	
Discipline		Kindness	
Interest		Originality	
Records		Courteousness	
Professional Growth		Patience	
Personality		Progressiveness	
Related Information		Leadership	
Grading System		Resourcefulness	
Shop Library		Truthfulness	
Time Allotments		Common Sense	
Attitude			
Health			
Methods			
Results			
Total Average		Total Average	

Teacher-Rating Sheet Requirements and Characteristics

Rating I.R. _____ Rating P.C. _____

Teacher-Rating Scheme

Name_____School_____
Last First Middle

Address_____Age_____

No. Years Taught_____Grade now Teaching_____

Subjects Now Teaching_____

Rated by_____Date_____

Description

Class	Weight	Meaning	Interpretation
A	1	Excellent or Superior	Always does more or better than required
B	2	Good or above average	Better than required
C	3	Average	Just meets requirements
D	4	Fair or above average	Less than required in quality but not quantity
E	5	Failure or poor	Below less than required

that they differ greatly, but that all have some advantages and purposes.

Directions for Rating

Give each characteristic and requirement under its separate heading a weight of 1, 2, 3, 4, or 5, according to its meaning and interpretation as shown above. After all have been weighted, obtain the sum of all the items weighted in each column, and divide by the number of items in the column. Interpret this weight according to the above table as to class and place result in spaces provided in upper corners of scheme.

The letters I.R. in the upper left-hand corner stand for individual requirements, and those in the right-hand corner, P.C., stand for personal characteristics.

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Problems and Projects

COLUMN-TYPE DRILL PRESS

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(See drawing on pages 293 and 295. Also 2 more drawings of details in the next issue)

The selection and preparation of problem material is ever in the mind of the drafting instructor. For a number of years it has been the aim of the writer to select material for drafting problems which are rich in related information. A problem of this type should include a study of the materials of construction, the problems confronting the patternmaker and the machinist and also the use of handbook tables and manufacturer's catalogs.

The column-type drill press illustrated in the accompanying illustrations is another in a series presented from time to time to the teachers who turn to the pages of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine for new project material.

In order that the readers may be assured that the problems are as near perfect as possible, the writer uses the following procedure.

The design for the machine is developed in the drafting class in cooperation with the patternmaking and machine-shop instructors. Next, the patterns are made by the patternmaking classes. The castings are obtained from an outside firm, as the school does not have a foundry. The machine is then built and put into service. Later, any possible improvements are studied and incorporated in the drawings. The machines are then built in groups of four or more, depending on demand.

In the meantime the perspective drawings are prepared and used as drafting problems. Not until a full semester's use has proved the value of the project is it offered to the editor. This further insures that the drawings will be as near correct as it is possible to make them.

The drawings themselves do not need much explanation as each teacher will use them according to his judgment. However, it is suggested that the various parts be assigned to the students according to their ability, thus providing for individual differences. The interrelation of the parts can be stressed and the pupils given the benefit of each other's work in making up the drawings of the complete machine. The assembly drawings may be made by advanced students from the details rather than from the perspectives, thus checking the work of the detailers for completeness and correctness.

In designating the ball bearings, the last three numbers are used to indicate the size of the bearing in accordance with the International Manufacturers' Standard. Any numbers or letters preceding them in the catalogs indicate the individual manufacturer's type or specification. The numbers on the perspective assembly should be noted with the above in mind.

ART-METAL WORK

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(Continued from page 254, June, 1941, issue)

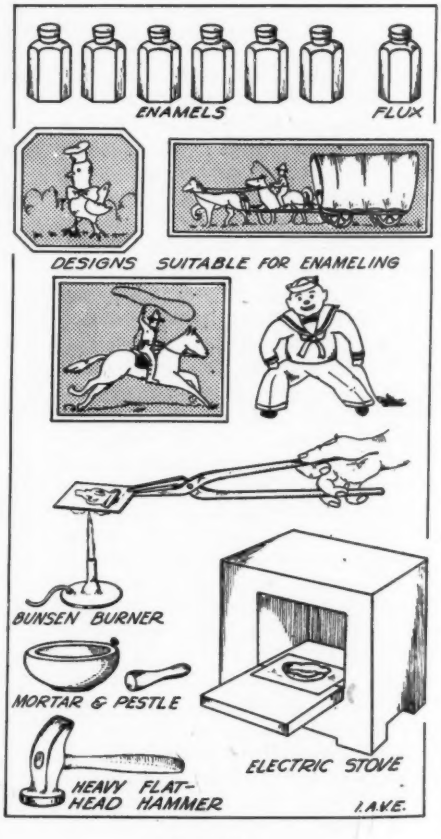
Enameling

By the use of enamels, the homecraftsman can produce many brilliant color combinations on dishes, bowls, trays, and the like. Enamel work of an elementary nature will give the beginner much satisfaction and for this reason enameling is popular. Enameling is the overlaying on metal of a pulverized colored glass which is then fused to the metal.

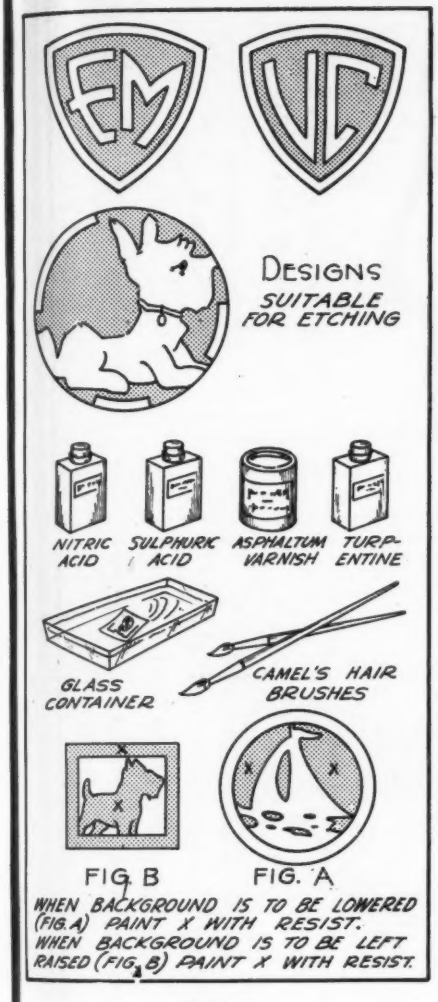
Copper, gold, and silver are the easiest metals for the work.

Enamels are bought in two forms, opaque and transparent. Opaque give their own color and transparent allows the natural metallic color to show through. A fondant or flux should be applied to the metal before the transparent enamels are used. This flux protects the enamel against an attack from the metal, especially copper. Opaque enamels do not require flux on the metal because they do not have to be protected from the underlying metal.

Enamel can be bought, ground, but for ordinary purposes, it is too expensive. It is better to grind it yourself.



Enameling



Etching

To Grind Enamel: Take a piece, wrap it in several layers of heavy paper, then cover this with canvas or cloth (to be sure the enamel will be kept inside and clean). Beat enamel with flat-headed hammer on an anvil or flat iron, turning from side to side while beating. Enamel will cut through paper, therefore while in the grinding process, unwrap and see if it has cut through badly. If it has, then change paper, rewrap and proceed as before until it is ground to the size of coarse salt.

If one can afford a wedgewood mortar and pestle, the work is easy. If not, one may use a substitute, such as the following.

Homemade Mortar and Pestle: Take a fairly heavy bowl made of common household china and a china door knob. This will do very well for a mortar and pestle. If necessary, a handle can be attached to the door knob.

Place enamel in the mortar, cover with an inch of water, grind with the pestle using first a rubbing and then a chopping motion. The water will become milky white with residue. Change water as often as necessary until it finally stays clear and until the enamel is ground to the size of fine table salt. Care should be taken not to pour off enamel when changing the water. Put different colors of enamel that have been ground into small glass containers.

If a small design is desired on the bottom of an ash tray or bowl, then etch the metal in such a way that the different colors of enamels may be placed in the sections lowered by the action of the acid.

If asphaltum is used as the resist in etching, remove with turpentine, then polish with fine powdered pumice until metal is bright and clean, then wash with clean hot water. By means of a spatula or similar substitute, place enamel into etched areas so they become well filled and evenly coated. A piece of blotting paper may be used to absorb the water that will come to the top.

A bunsen burner, a blowpipe, a common gas stove, or if fortunate enough, an electric muffle furnace can be used as heat.

The metal should be placed on a heavy iron tray or wire netting. Dry the enamel slowly. Hold the screen or tray with tongs and move it back and forth over the flame. When dried, lower to the hottest part of the flame. The metal will become red hot and then the enamel fuses. Be sure that the enamel cools gradually, to prevent cracking. In case of cracking, reheat or re-fuse.

To clean, use crocus on a soft cloth. Polish outside with buffing wheel.

Notice: Do not bend the metal as it has been softened from the heating.

If there is a spot left without any enamel, clean, add more enamel and re-fuse.

After some practice, one may then be able to obtain such effects as a sunburst, figures or designs of many colors. Often layers of transparent enamels are built upon each other, the under layer lending certain tones to the new layer. Prepared fluxes may be obtained: copper flux — silver flux — gold flux — an all-round flux is Gum Tragacauth.

Pewter

After working with a particular metal, one becomes curious as to when it was first used and by whom. Some of these metals are traceable to biblical, and even prehistoric times.

Pewter, for instance, can be traced back to the Romans, who used it to make spoons, plates, salt shakers, and the like. Pewter was used specially in countries where wood was scarce.

During the reign of Edward the Third of England (1348), guilds were established to protect the industry and confiscate materials of inferior quality. Step by step the guild obtained greater power so that they:

1. Supervised the making of the alloys;
2. Destroyed poor work or materials;
3. Limited work to guild members or their apprentices;
4. Instituted searches throughout England for inferior metal so they might confiscate it. Those found with poor metal were compelled to give up the articles made of them and lost the privilege of further producing things made of pewter. Trade secrets were guarded closely, no work could be done in public and no pewterer could leave the country. The decline in the use of pewter came with the introduction of cheap china and cheap earthenware.

The old pewter was composed of 80 parts tin, and 20 parts lead.

Modern pewter, known as Britannia metal, is composed of 150 parts tin, 10 parts antimony, and 3 parts copper.

Other modern alloys consisted of 91 parts tin, 7.5 parts antimony, and 1.5 parts copper.

Pewter resembles silver in color, is very ductile and malleable. The little patina which forms on the surface after four to six months can be removed, but this is usually allowed to accumulate as it adds to the beauty of pewter.

The advantages of pewter are:

1. Malleability without annealing,
2. Attractiveness of color,
3. Freedom from oxidation,
4. Comparative ease in soldering,
5. Historical and traditional value.

Because of these reasons, pewter is used in the school and home workshop.

Copper

Copper, probably one of the oldest metals used by man, is widely used as a craft metal. The first source must have been deposits caused by the rains which washed pieces of the metal down the sides of the mountains. At Oxford, a Stone Age collection contains hammered copper implements. There has been a working knowledge of copper for over 5000 years.

Origin of Name: Greek historians called this metal "Chalkos" because of the deposits found near the town of Chalko on the island of Eubeoa. For the same reason the Romans call it "Cyprum" due to finding some of the metal on the island of Cyprus. In time this became the Latin word, *cuprum*, and now copper.

In America copper was worked and used before the time of Columbus. The Spanish conquest of South America found copper largely used. Jesuit missionaries found mines at Lake Superior during the sixteenth century.

The actual date of the discovery of copper is, of course, unknown, but it is believed to have happened during the Stone Age 13,000 years B.C. Evidently the first nugget was found by chance possibly in a dry stream bed. After hammering, it was found that it would not break and that by rubbing it could be polished. There is no definite knowledge, either, of how early man came upon smelting. Probably hot fire on a part of the ground containing a copper deposit, or perhaps a piece, dropped by chance into the fire, called man's attention to what could be done with the metal.

There are many interesting facts known about copper. The Egyptians hammered copper into thin sheets 8000 years ago. A coppersmith, 2750 B.C. made 1300 feet of pipe, 1.85 in. in diameter, for a water drain in the temple of King Sa-hur Re at Abusu. A piece of this pipe is exhibited in the museum at Berlin. The walls of it are .06 in. thick.

In the early days of New England, utensils were fashioned out of copper. Then in 1851, Hayden in Connecticut, introduced the spinning of copper. The first foundry in New England was set up in 1644 by John Winthrop. Brass cannons were cast here before the Revolution. In 1808 a mill was erected at Attleboro in which water power was used, on this type of work, for the first time. In 1846, a combination of steam and water power was introduced, and in 1851 the entire plant was turned over to the use of steam alone.

SAFETY POSTERS

H. Gordon Douglas,

Printing Instructor,
Neinas Intermediate School,
Detroit, Mich.

The safety posters shown herewith were prepared by advanced students of the printing class at Neinas Intermediate School. The linoleum blocks were at first cut by the instructor, but he found much latent talent among the students in his classes, and some of the safety posters shown were printed from blocks cut by the students.

SAFETY FIRST

The First Aid Cabinet is placed in each Shop and Laboratory so that minor injuries may be treated. Report all cuts, scratches, and burns to your Instructor for First Aid in order to prevent infection.

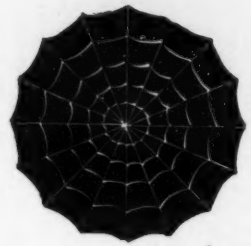
BE CAREFUL

SAFETY FIRST

Many accidental deaths and serious injuries are the results of falls. See that aisles and stairways both in the shop and at home are kept clear at all times.

BE CAREFUL

SAFETY FIRST



HABITS
Are at first spider webs

at last Cables

Make sure you are forming the proper Safety Habits.

BE CAREFUL

SAFETY FIRST

If You Want To Use

Your Hands

Use Your Head

Don't Let Carelessness Destroy
What can Never Be Repaired

BE CAREFUL

SAFETY FIRST

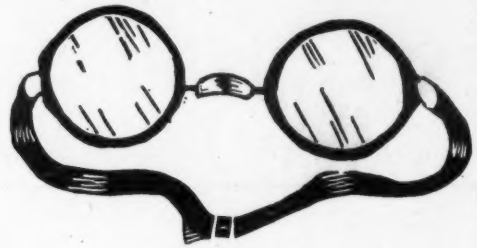
The Seeing Eye is marvelous for the blind

YOU don't want to be blind

Wear goggles when operating the grinder.

BE CAREFUL

SAFETY FIRST

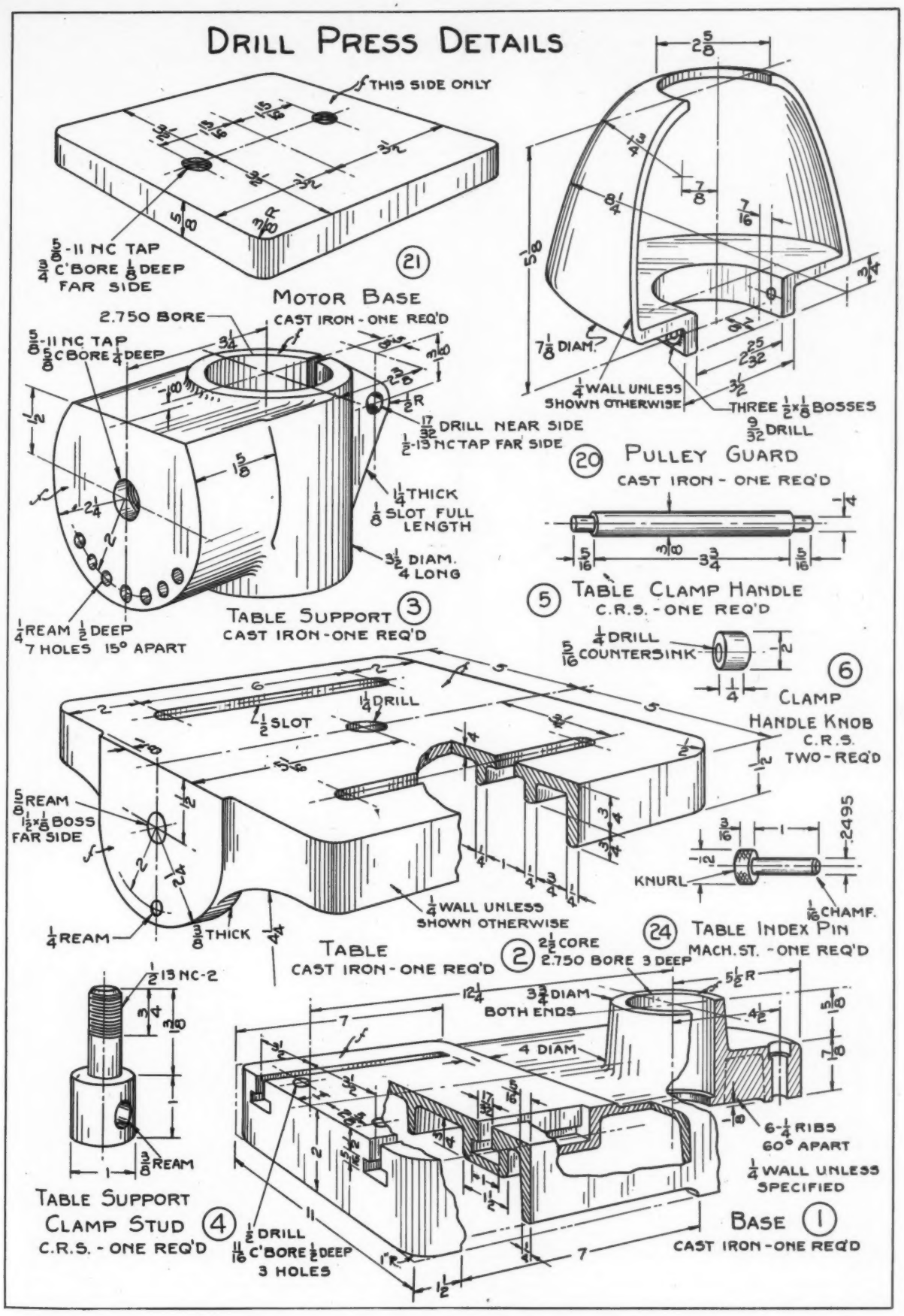


Goggles are always worn when operating the Grinder

Eyes Cannot be Replaced

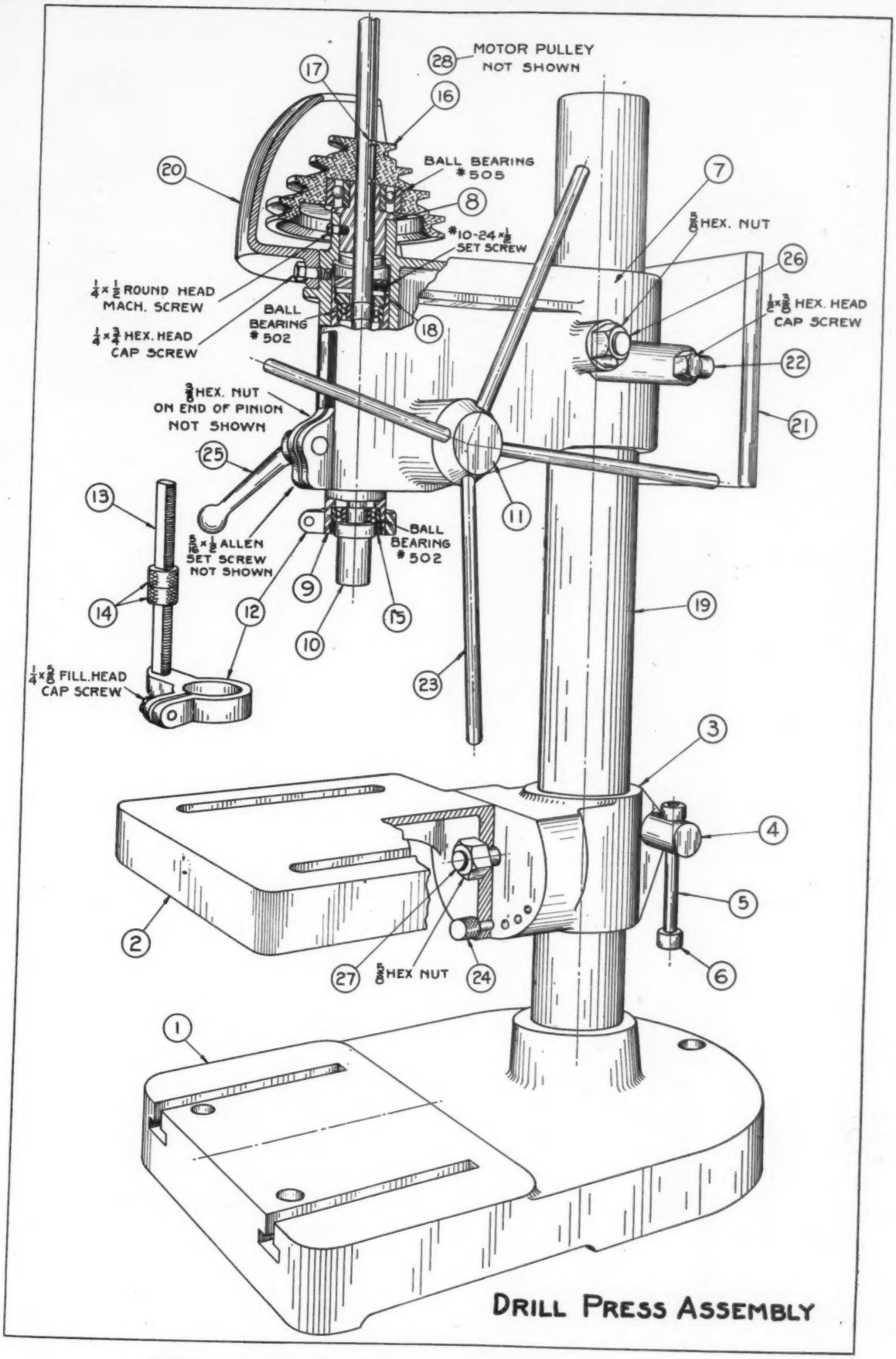
BE CAREFUL

Safety posters submitted by H. Gordon Douglas (Turn to page 297)


DRILL PRESS DETAILS
THIS SIDE ONLY
5/8-11 NC TAP C'BORE 1/8 DEEP FAR SIDE
21 MOTOR BASE
CAST IRON - ONE REQ'D
2.750 BORE
5/8-11 NC TAP 5/8 C'BORE 1/4 DEEP
1/2R
17/32 DRILL NEAR SIDE
1/2-13 NC TAP FAR SIDE
1 1/4 THICK
1/8 SLOT FULL LENGTH
3 1/2 DIAM. 4 LONG
1/4 REAM 1/2 DEEP 7 HOLES 15° APART
3 TABLE SUPPORT
CAST IRON - ONE REQ'D
7 1/8 DIAM.
1/4 WALL UNLESS SHOWN OTHERWISE
THREE 1/2 x 1/8 BOSSES 9/32 DRILL
20 PULLEY GUARD
CAST IRON - ONE REQ'D
5 TABLE CLAMP HANDLE
C.R.S. - ONE REQ'D
1/4 DRILL 5/16 COUNTERSINK
6 CLAMP HANDLE KNOB
C.R.S. TWO - REQ'D
1/4 DRILL
1/2 SLOT
5/8 REAM 1 1/2 x 1/8 BOSS FAR SIDE
1/4 REAM
3/8 THICK
1/4 WALL UNLESS SHOWN OTHERWISE
TABLE
CAST IRON - ONE REQ'D
2 1/2 CORE 2.750 BORE 3 DEEP
24 TABLE INDEX PIN
MACH. ST. - ONE REQ'D
KNURL
1/16 CHAMF.
1/2-13 NC-2
3/8 REAM
TABLE SUPPORT CLAMP STUD
C.R.S. - ONE REQ'D
4
1/2 DRILL 11/16 C'BORE 1/2 DEEP 3 HOLES
3 3/4 DIAM BOTH ENDS
4 DIAM
6-1/4 RIBS 60° APART
1/4 WALL UNLESS SPECIFIED
1 BASE
CAST IRON - ONE REQ'D

Drill press assembly submitted by W. A. DeVette, Erie Technical High School, Erie, Pa. For description see page 290

Safety posters submitted by H. Gordon Douglas (Turn to page 297)


MOTOR PULLEY NOT SHOWN
BALL BEARING #505
#10-24 × 1/2 SET SCREW
1/4 × 1/2 ROUND HEAD MACH. SCREW
BALL BEARING #502
1/4 × 3/4 HEX. HEAD CAP SCREW
3/8 HEX. NUT ON END OF PINION NOT SHOWN
5/16 × 1/2 ALLEN SET SCREW NOT SHOWN
BALL BEARING #502
1/4 × 5/8 FILL. HEAD CAP SCREW
5/8 HEX. NUT
1/2 × 3/8 HEX. HEAD CAP SCREW
5/8 HEX NUT
DRILL PRESS ASSEMBLY

Drill Press details. Two additional sheets of details will appear in the October issue of Industrial Arts and Vocational Education

SAFETY FIRST

SAFETY FIRST

SAFETY FIRST

SAFETY FIRST

LOSE A

HAND

AND YOU LOSE A

FORTUNE

BE CAREFUL

SAFETY FIRST

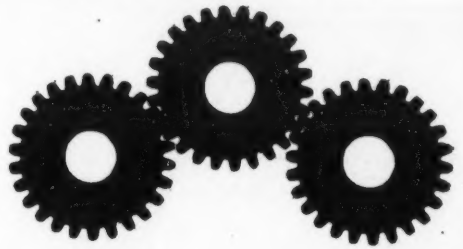
Read the Instructions pasted on the side of the can in one of your spare moments.

Knowing how to use the blanket might be the cause of your saving a life some day.

A FIRE BLANKET is kept in a red metal container in your foods laboratory. Should a person's clothing catch fire, lose no time in getting the blanket and using it properly.

BE CAREFUL

SAFETY FIRST



Loose clothing or dangling neckties are OUT OF PLACE when working on machines.

BE CAREFUL

SAFETY FIRST

Artificial Respiration has saved many lives. It is used in cases of drowning, shock or asphyxiation. Know how it is done. You might be able to save a life some day.

BE CAREFUL

SAFETY FIRST

Spontaneous combustion is responsible for a great percentage of the total fires that occur. Be sure that all oily rags in the shop and at home are placed in tightly closing metal containers.

BE CAREFUL

SAFETY FIRST

It is the duty of every man to protect himself and those associated with him from accidents which may result in injury or death.

Abraham Lincoln

BE CAREFUL

Safety posters submitted by H. Gordon Douglas (Continued from page 292)

The safety posters, after having been printed at Neinas Intermediate School, were then distributed to the other intermediate and high schools of Detroit where they are used in the various school shop cases.

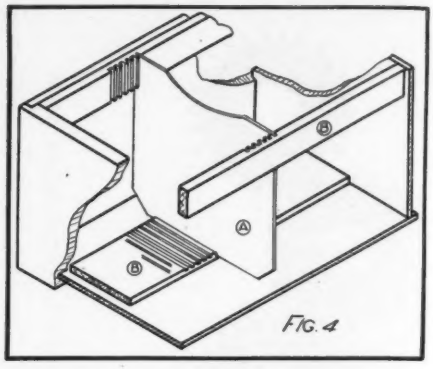
PRACTICAL FILE CABINET FOR MUSIC DEPARTMENT

Charles M. Rice,
Everett, Wash.

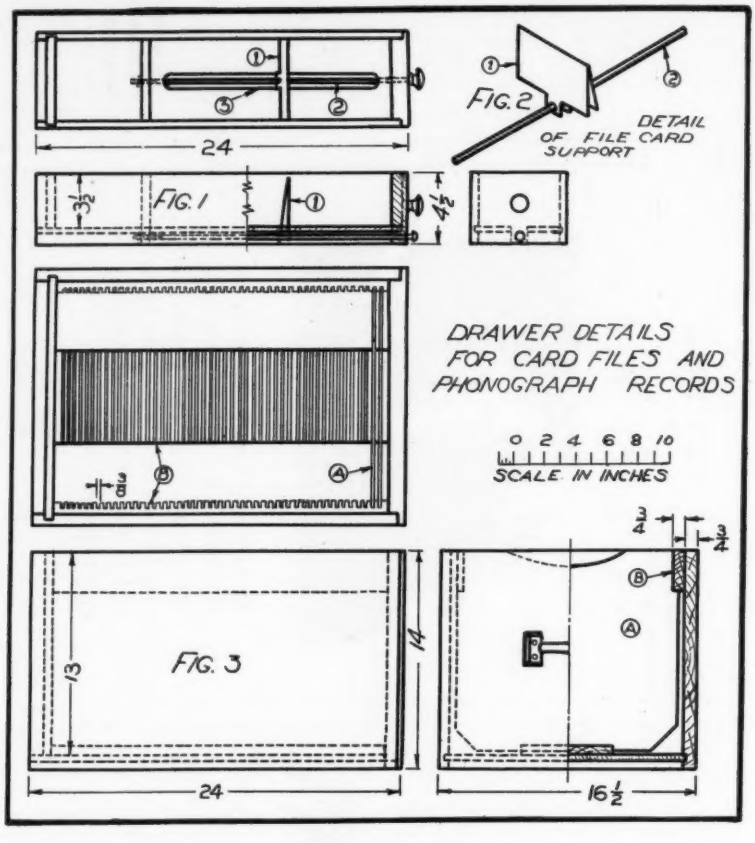
The music file cabinet illustrated and described herewith, is a compact arrangement for keeping pupil-record cards, music books, phonograph records, and the like. The cabinet is large enough to meet the requirements of the average high school as there is room in the drawers for 200 phonograph records and ample cupboard space for music books and sheet music. However the size and design may be changed to meet local requirements if more space is needed.

The phonograph record drawers are fitted with wooden strips, shown at *B* in Figures 3 and 4, having saw kerfs spaced ⅛ in., o.c., to receive the cardboard separators, *A*, also shown in Figures 3 and 4. A file number may be placed between each saw kerf, at top right-hand edge of each drawer, and a typed record sheet made with corresponding numbers to be posted in some convenient place.

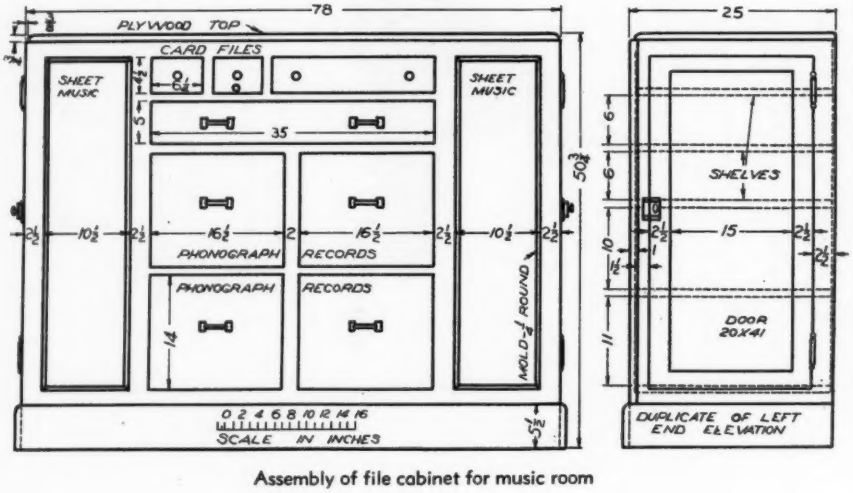
The small drawers for pupil record cards may be fitted with a 3/16-in. rod, shown as part 2 in Figures 1 and 2. The file-card support is made of sheet brass, bent double, as shown in Figure 2.



Method of notching sides and bottom pieces



Details of cabinet



Assembly of file cabinet for music room

MORE THAN JUST A PLAN SHEET

Bernard G. Swift,
Pearl River Public Schools,
Pearl River, N. Y.

One of the foremost aims of industrial arts is to teach students to adequately plan their work before the actual work is started. Too frequently, however, this aim is only partially carried out, simply because the students are not sufficiently prepared for the work or else the plan sheet used does not follow the necessary planning in a logical order that a student with a limited experience can follow. At the same time, many plan sheets do not carry through the complete planning but merely list the main materials that are to be used.

The accompanying plan sheet has been developed, over a period of years, in such a manner that students may use it satisfactorily after only a short period of instruction as to its use has been given. This has been proved through four years of actual shop use. The entire sheet is arranged in sequential order, carrying through from the selection of materials, finish, and hardware, to the cost, order of operations, drawings, and related materials that are used. It will be noted that it meets the needs of any of the seven activities that are listed at the top of the sheet.

Two main features, included in this plan sheet, are the "helpful hints" at the bottom of the first page, and the space for the listing of mistakes that have been made in the construction of the project. Many instructors find that too much time is consumed in answering numerous small questions relative to the proper planning of the work. The most frequently asked questions have been incorporated into as few words as possible and placed where the student may have them constantly before him as he does his planning. This may also serve as a teaching device since it is generally agreed that much learning is accomplished by simply absorbing information that is continually before us.

It is also accepted that everyone learns from past mistakes, particularly if the mistakes are recognized and then thought out in their corrected form. By including a space for the listing of errors, the boy is made aware of the fact that he may make mistakes, as is only human, and that he should go far enough into the correction of these errors so he will not repeat them on future projects.

Included also is a space for the listing of

INDUSTRIAL ARTS DEPARTMENT — PEARL RIVER SCHOOLS

STUDENT PLAN SHEET

"THINK THROUGH BEFORE YOU DO"

MY NAME IS _____

THE NAME OF MY PROJECT IS _____

THE SOURCE OF MY PROJECT IS _____

In constructing my project, I shall work and study in the following industrial fields: **(Circle proper field of work.)**

GENERAL CERAMICS
GENERAL METAL WORKING
GENERAL ELECTRICITY
GENERAL PRINTING
GENERAL WOOD WORKING
GENERAL TEXTILES

In completing the operations and processes I shall use the following materials:

QUANTITY	NAME OF PART	KIND OF MATERIAL	THICKNESS	WIDTH	LENGTH	LIN. FT.	BD. FT.	SQ. IN. or FT.	WGT.	UNIT PRICE	COST

TOTAL COST OF MATERIALS _____

I shall apply the following finish materials to my work:

NO. OF COATS	FINISHING MATERIAL

To find the cost of my finishing materials, I multiply the cost of my materials by twenty per cent.

This cost is _____

I shall use the following hardware supplies:

QUANTITY	NAME OF SUPPLY	SIZE	UNIT PRICE	COST

TOTAL COST OF HARDWARE _____

HELPFUL HINTS

BOARD MEASURE FORMULA

No. Pcs. X Thickness in Inches X Width in Inches X Length in Feet / 12 = B. F.

No. Pcs. X Thickness in Inches X Width in Inches X Length in Inches / 12 X 12 = B. F.

Art metals are sold by the square inch.

Prices of materials are on the bulletin board.
Nails are sold by the pound.
Cork, plywood and sheet metals are sold by the square foot.
Dowel rod, square stock for turning and wrought iron are sold by the linear foot.
Screws are sold by the gross.
Animal glue, casting metals, clays, glazes and yarn are sold by the pound.

This plan sheet, together with all required drawings and write-ups on related information and other things of interest, should be handed in with the completed project for marking by the instructor.

I shall now be able to find the total cost of my project by adding the following:

COST OF MATERIALS _____
COST OF HARDWARE _____
COST OF FINISHING _____
GRAND TOTAL _____

DATE STARTED. _____
DATE FINISHED _____
INSTRUCTOR'S APPROVAL TO START PROJECT _____
INSTRUCTOR'S GRADE _____
DATE PAID _____

If a drawing is required I shall make it on drawing paper and attach it to this sheet.

I shall list the procedure of operations required to complete this project.

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____
9 _____
10 _____
11 _____
12 _____
13 _____
14 _____
15 _____
16 _____
17 _____
18 _____
19 _____
20 _____
21 _____
22 _____
23 _____
24 _____

I shall use the following related materials in the construction of this project

_____
_____
_____
_____
_____
_____
_____

I should like to know more about the following things concerning this project. I shall look them up and hand them in with my project.

_____
_____
_____
_____
_____
_____
_____

While making this project I have made the following mistakes that I will try not to make again:

_____
_____
_____
_____

I [have] [have not] selected my next project and it is _____

Front and reverse side of student plan sheet

related materials; such as, various kinds of wood, metal, stain, filler, shellac, and varnish; that are used in the construction of the project. It is recommended that the students be required to look up specific information about these materials and place them in their notebooks, after having their work approved by the instructor.

This sheet has also been found to motivate pupil interest in new fields of work with which they have had no previous contact. Boys coming in contact with unfamiliar terms, in the "helpful hints" or elsewhere, are certain to ask questions about them. Once a boy has been interested to the point of asking questions, the skillful teacher should find little difficulty in developing this interest into a new and worth-while activity for the boy.

As a final point of usefulness, this plan sheet may aid in the keeping of records which contain the instructor's grade and other pertinent information usually recorded. The entire sheet may be filed under each student's name or the grade and other information may be transferred to the usual record book.

It is recommended that once this plan sheet is put into use, that it be adhered to in the strictest manner. At the beginning, boys are prone to start projects with little or no planning but if the instructor will permit no one to start any project until his (the instructor's) initials appear in the "Instructor's approval to start project" space, they will soon learn that the plan sheet is a necessary part of the project. After the boys have acquired the habit of completing the plan sheets, they will quickly realize that these sheets have assisted materially in saving time, effort, and materials.

A NOVEL FISH POLE

Arnold Radtke,
Milwaukee, Wis.

Here is a fish pole that is different. It is meant for those fishermen who prefer the side or handline, but pole fishermen will find it useful also. The hollow handle is used to store hooks, the line, and sinkers. A cork pressed in the opening seals it and keeps the things safe. A screw eye at the tip provides free passage of the line. Two dowels on top of the handle make a reel for winding on the line.

A straight pole would always have a tendency to tip or turn downward causing the line to unwind; whereas the bent or hook pole gives balance and helps keep the dowels upright. Almost any kind of lumber may be used. We made ours of gumwood.

To make this novel fish pole, cut a board from rough stock 1⅛ by 3 by 16 in. For convenience in laying out, draw the vertical lines ½ in. apart and the horizontal lines ¼ in. apart. Trace the design on the board. Saw out the corner below the handle 1¾ by 5 in. Locate the points for lathe centers ¾ in. from the top on the center line of the ends. Place the board between lathe centers and turn the handle. Spokeshave the handle if no lathe is available, 1 in. in diameter, 6 in. long. Cut out the design with a coping or a band saw. Taper the sides of the curved part from 1 in. at the handle to ¼ in. at the top. Spokeshave the sides and corners to an oval, working from the tip and handle, always cutting with the grain of the wood. Bore a ¾-in. hole in the handle 4 in. deep. Measure a point 4⅜ in. on top and from end of handle. Glue in the dowels as shown. Sandpaper the entire surface smooth, and oil and wax it, or apply two coats of good varnish. Screw a ¼-in. screw eye in tip for passage of line. All that is needed now is the fish.

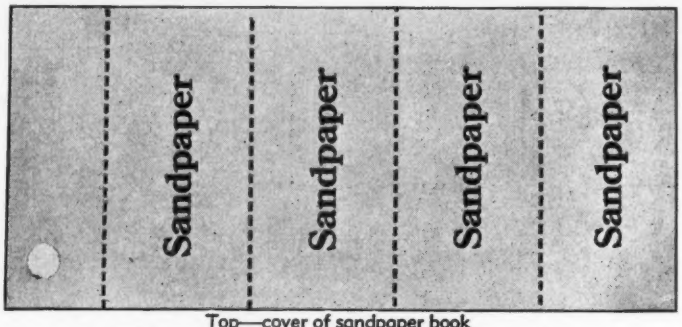
SANDPAPER BOOKS

C. F. Van Nortwick,
Wilbur Wright Junior High School, Cleveland, Ohio

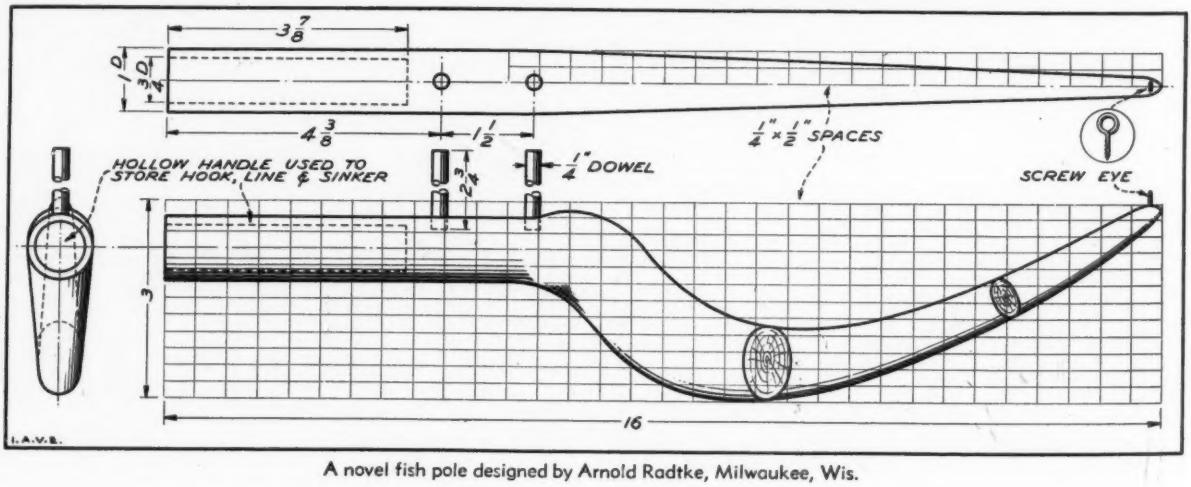
To teachers of woodwork, the mention of sandpaper usually suggests trouble. Many methods have been employed with some measure of success, not counting worn-out shop-coat pockets, unused sandpaper on the floor, and many other ills resulting from a poor system for the proper distribution of sandpaper.

We tried various methods but none were foolproof nor satisfactory. The last device, the one described here, has proved satisfactory in every respect.

The sandpaper book is a small book containing 32 sandpaper coupons. The book is sold to the pupil for five cents. For this sum he gets 32 pieces of sandpaper, each of which is equal to 1/12 of a full sheet of sandpaper. A hole punched in the binder enables the pupil to securely fasten the coupon book in his notebook, so that it will always be in the shop when wanted.



Top—cover of sandpaper book
Bottom—one of the 8 inserts of four coupons each



A novel fish pole designed by Arnold Radtke, Milwaukee, Wis.

When the student is in need of sandpaper, he goes to the stock clerk, presents his sandpaper book and states the grade of sandpaper wanted. The clerk tears the coupon from the book, places it on a spindle and gives the student the desired piece of sandpaper. By this method the student is using his own sandpaper and is therefore, in most instances, more careful about waste. Since using the sandpaper book, our sandpaper consumption has been approximately cut in half.

The book is sold at the beginning of the semester for five cents and recorded on the student's shop card by number. It is redeemed at the close of the semester at the rate of six coupons for one cent.

This redemption of books gives us a supply of half-used books. We have extra front covers for these old books and by dismantling the old books, they are reassembled with new covers, serially stamped, and sold again.

We have found this sandpaper book to be a teaching device not to be overlooked in any woodworking shop where organization and economy are a part of the teaching plan.

SAWDUST TRAP FOR CIRCULAR SAWS

J. I. Anderson,
Los Angeles, Calif.

For several years we had trouble with sawdust from the circular saw filling the air, our lungs, and equipment with a "cloud of dust." To overcome this condition the sawdust trap here sketched was devised. It has been in operation now for over a year and has proved very satisfactory. I would not be without it.

The trap consists of a 24 by 36 by 34-in. plywood box *J*. These dimensions, of course, are not important. This box is divided by a diagonal lid *B* which is hinged by two screws at points *C–C*. This allows the lid to be raised for cleaning out the sawdust in the lower part of the box. A tin pipe *A* is attached from the circular saw into the lower section of the trap. An electric blower *D* produces a vacuum which in turn draws the sawdust into the box. A stop *E* made from wood and a rubber gasket forces all the air through one side of the blower. Two stovepipe elbows direct the air to the top section of the box and on the end of *F* is attached a vacuum sweeper bag *G*. This bag catches all fine particles and the filtered air leaves the box through a wire screen *H*. Another lid *I* (not shown) covers the entire box at the top. The switch controlling the blower is located near the switch for the saw, thus making it easy to operate. The stovepipe elbows can be removed when desired and a vacuum hose attachment may be connected to the blower. This makes a good blowing attachment for cleaning out sawdust from the saw or other machinery near by. Where the motor connects the box, a hole is cut and a rubber gasket and a furring strip connects the two units.

A MICROMETER-READING LESSON

J. H. McCloskey,
Senior High School,
Lakewood, Ohio

To Read the Micrometer

Examine micrometer and compare it with Figure 1. Read all the way through this instruction sheet and then read again carefully. Be sure you understand *a, b, c, d,* as applying to Figure 1, before trying to read the micrometer.

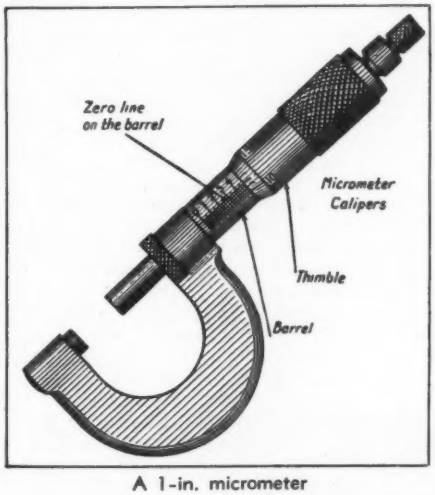
Directions:

1. Observe the largest figure on the barrel and write it with a decimal point in front of it.

2. For the divisions between the number just observed and the beveled edge of the thimble, place the following readings to the right of the number already set down:
   00 for less than one division
   25 for one division
   50 for two divisions
   75 for three divisions

3. Point at the figure on the thimble below the zero line on the barrel. This figure may be 0, 5, 10, 15, or 20. Be careful not to count a part of a division on the barrel as a full division. If the 0 on the thimble is just above the zero line on the barrel, the last division on the barrel is not quite a full division.

4. Starting with the figure on the thimble pointed at, count in addition the divisions up to the zero line on the barrel.



A 1-in. micrometer

5. Add this number as so many thousandths to the number as obtained in item 2.

6. If the micrometer is made to measure more than one inch, add smallest measurement it is supposed to make to the result obtained in item 5.

In Figure 1:

(*a*) Largest number on the barrel is 4, which must be written as .4.

(*b*) From 4 up to the end of the thimble are three divisions, therefore place 75 after .4, obtaining .475.

(*c*) The first number on the thimble below the zero line on the barrel is 10. Starting with this number count the divisions up to the zero line on the barrel: ten, eleven, twelve, which stands for twelve thousandths (written .012).

(*d*) Add twelve thousandths to .475, and the final reading is .487.

Questions:

1. How many thousandths of an inch does the spindle move when thimble is turned one complete revolution? Why?

2. Can you read the micrometer closer than a thousandth of an inch, if so how?

3. How does the reading of a micrometer depth gauge differ from the reading of an inside or outside micrometer?

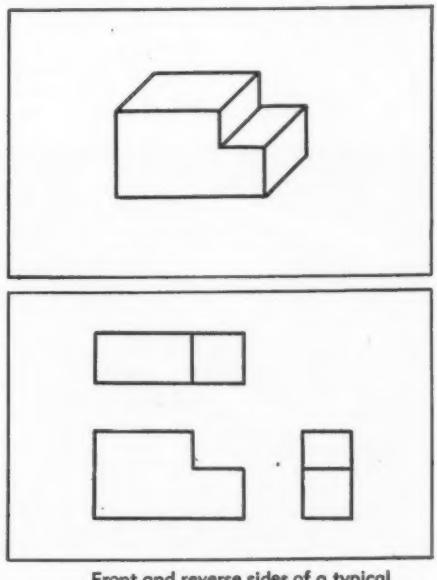
4. Set the micrometer to read .023; .106; .362; .750; .899; 1.012.

FLASH CARDS FOR MECHANICAL-DRAWING CLASSES

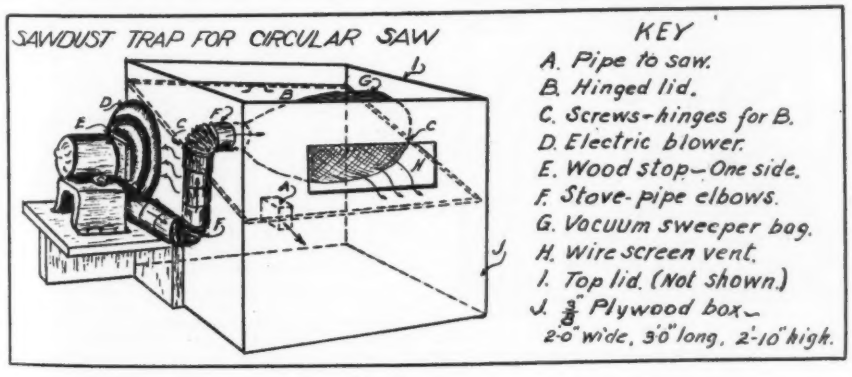
R. R. Bedker,
High School,
Wauwatosa, Wis.

We have used 8½ by 11-in. heavy flash cards, such as the one shown herewith, in the mechanical-drawing classes at the high school in Wauwatosa, Wis., with very good success. On one side of these flash cards is shown an oblique, perspective, or isometric drawing and on the other side a two- or three-view orthographic drawing. The scheme may be extended to include other phases of mechanical drawing; that is, auxiliary views, sections, and the like.

The flash card is a timesaver and organizer for the short mechanical-drawing period. For example: one may place one or more oblique



Front and reverse sides of a typical 8½ by 11 in. flash card



flash cards in the front of the room at the beginning of the period. The student can be instructed so that he automatically starts to sketch a two- or three-view orthographic drawing in his sketchbook. After a few minutes the instructor reverses the card, which gives the correct orthographic views. The student can readily check his mistakes.

The process can also be reversed by having the student make oblique, isometric, and perspective drawings from the orthographic views.

Daily five to ten-minute sketch drills give the instructor time to move about the class and to help students individually.

Advantages of the Flash Cards

Visual Aid

1. Focuses the attention of the group upon certain mechanical drawings.
2. Gives practice in rapid visual recognition of drawings.

Drill Aid

1. Provides a means of drill on specific mechanical drawings. Select type of drawings that need drill work.
2. Repetition can easily be provided according to need of group or individual.
3. Contest or game idea may be used for motivation.
4. Convenient form for providing mechanical-drawing drill on desired elements.
5. Presents one situation at a time to the student.
6. Gives an opportunity for individual or group work.
7. Provides for an *exposure* of limited time which is considered desirable in drill work.

How to Make Charts

We have experimented in making charts and have found that a Speedball pen number A-3 gives a line of proper width for good visibility in the average drawing room. The pen is easier to handle than the regular ruling pen for wide lines. We use a Speedball pen number A-2 for border lines to give contrast. A regular compass pen (ink) is used for making arcs and circles. The *build-up* method is best for arcs and circles, that is, make a narrow width line and then increase the width of the line by changing the radius slightly each time.

A SHOP STORAGE KINK

Wayne M. Judy,
Backus Junior High School,
International Falls, Minn.

The storage of nails, screws, bolts, dowel pins, glue, and other similar articles has always been somewhat of a problem to the school-shop instructor. Perhaps it is also a problem for the homecraftsman as well as to the commercial shop workmen. With this in mind, perhaps, the idea shown in the illustration will prove of value.

The author likes the receptacles shown, better than any of the many he has tried in the past, because:

1. An assortment of supplies such as nails or screws are easily taken to the job wherever it might be.
2. The racks are very inexpensive, in fact, the total cost of each is only 12 cents.
3. The racks are very easy to construct, consisting only of a simple woodwork problem plus the cutting of the tops out of Prestone cans with a smooth cutting can opener.
4. The racks when complete are quite neat in appearance and add a touch of orderliness to a shop, be it a school, commercial, or home workshop.

Supply receptacles

OILSTONE CABINET

Don K. Wildgrube,
Tower-Soudan School,
Tower, Minn.

Every shop teacher who is interested in teaching the use and care of tools realizes the importance of showing the student how to keep them sharp. To carry on the lessons on sharpening, an assortment of oilstones, hones, and strops, is necessary. To be effective oilstones and like equipment must be readily available, easy to use, in good shape, and easy to keep in place and condition.

The portable oilstone cabinet, described herein, has been found to be very useful and extremely effective. It is made of birch with the exception of the back which is ¾-in. fir plywood, and the shelves which are ¾-in. pine.

The top is split and hinged with invisible hinges chained to the sides so it may be tilted back at an angle to be out of the way of the operator, and yet not to touch the wall or be in the way of the person passing to the rear of the cabinet. The small section of the top is fastened to the body with dowels and glue. The front apron is hinged to the top in such a way that it folds back when the top is raised, and makes a part of the front when the top is down. One pair of 1½ by 2½-in. plain butt hinges is used for this purpose.

The front of the cabinet is doweled together, the sides tongued and grooved to the front, and the back tongued and grooved to the sides. The shelves are held in place with cleats, screwed to the sides and the shelves.

Oilstone cabinet

The sliding board upon which the oilstones are mounted is cut ¼ in. shorter and ¼ in. narrower than the shelves. This piece is covered with 30-gauge galvanized iron and the corners are soldered to keep the oil from seeping into the board. The stones are arranged on this board and fastened into place by soldering small angles at the corners of each stone. At present we are using three 1 by 2 by 6-in. carborundum stones, and three 1 by 2 by 5-in. Washita stones. Provision was made on the board for extra stones when the need was felt. A 1/3-pt. Eagle oiler is being used to hold the cleaning and lubricating fluid for the stones. It was necessary to cut down the spout, fill it with solder and drill a small hole to control the flow of liquid. This arrangement of stones can be slid out of the cabinet, reversed and replaced, making either set of stones available to the operator.

Storage space is provided below for other abrasives, stones, waste, and grinding equipment. The doors are made of solid birch and hinged to the cabinet with 1½ by 1½-in. loose-pin butts and ¾-in. brass knobs are used as pulls.

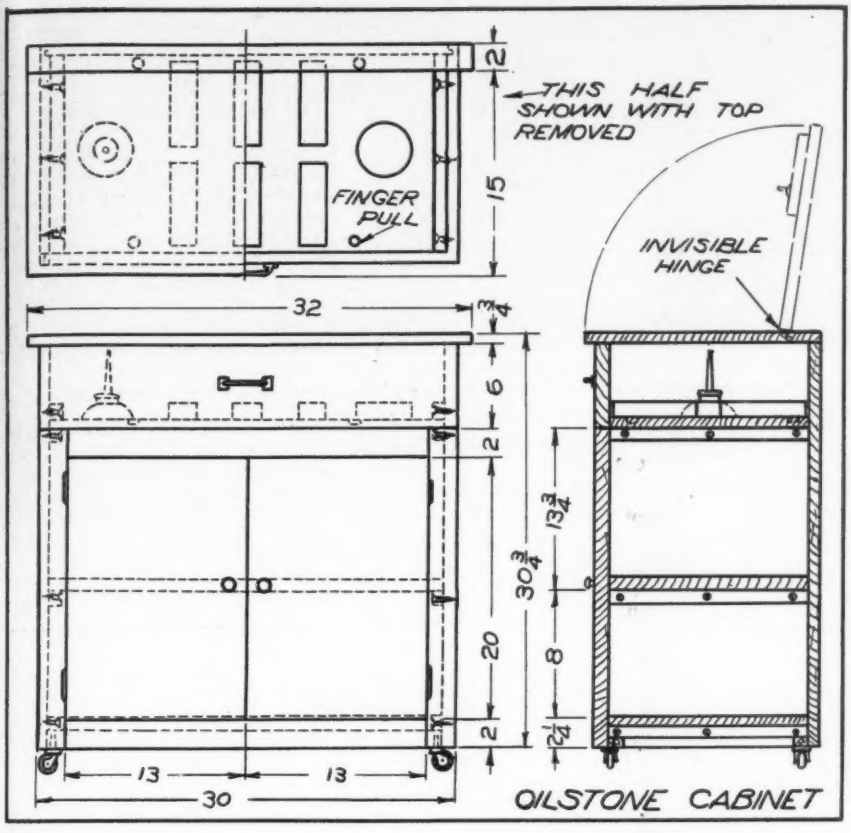
The cabinet was oiled and given two coats of varnish and rubbed down. This finish harmonized very effectively with the rest of the shop furniture.

Portability was considered as an asset so we placed Faultless casters in blocks and glued them in place in the corners. If the cabinet seems too low, feet may be added as shown in the picture.

Bill of Materials

Top	1 pc.	¾ x 14 x 32-in. Birch
	1 pc.	¾ x 3 x 32-in. Birch
Front	1 pc.	¾ x 6 x 30-in. Birch
	2 pc.	¾ x 2 x 24-in. Birch
	2 pc.	¾ x 2 x 26-in. Birch
Doors	2 pc.	¾ x 13 x 20-in. Birch
Sides	2 pc.	¾ x 15⅝ x 30-in. Birch
Back	1 pc.	¾ x 29¼ x 30-in. Fir plywood
Shelves	2 pc.	¾ x 14½ x 28½-in. Pine
	1 pc.	¾ x 14¼ x 28¼-in. Pine
Cleats	8 pc.	1 x 1 x 14½-in. Maple
Feet	8 pc.	¾ x 3 x 6-in. Birch (optional)
	3 hinges, Soss invisible, No. 100*	
	1 set Faultless casters, No. 4735	
	3 ft. steel safety chain, No. 2	

*All catalog numbers taken from Brodhead Garrett Co., Cleveland, Ohio.



1 pc. galvanized iron, 30 ga., 19 by 33
2 pr. 1½ x 1½ loose-pin butts Brass No. 1431
2 friction catches, No. 37
1 drawer pull brass, No. 143
4 ¾ in. finger pulls
2 ¾ in. brass knobs, No. 481
48 f.h. screws, No. 8 1½ in.
4 r.h. blued screws, No. 6 ⅝ in.

PRINT-SHOP SAFETY RULES

E. V. Ahonen,
Independent School District No. 40, Chisholm, Minn.

Printing machinery is not dangerous when properly operated, but through carelessness, severe injury is possible.

The following list of safety rules must be observed by all boys working in the school print shop at Chisholm, Minn., in order to prevent accidents. No boy is permitted to work on any machine until he has mastered the safety rules for that machine, and *any infraction of the rules thereafter is considered cause enough to bar him from further work on the machine.*

General

1. Walk — do not run, a fall may be serious.
2. Never attempt to use a machine without permission and instruction.
3. *Do not stand around a machine that is in operation.*
4. Use the boxes only as they are intended to be used; do not set them on end for stools. (Boxes referred to are used by small boys to stand on, to give them the proper height for typesetting comfortably.)

The Boston Wire Stitcher

1. Keep your fingers at a safe distance from the driver.
2. Do not attempt to repair the machine if something goes wrong, call the instructor.

The Proof Press

1. Only one boy may work at the proof press at a time.
2. Do not rest your hands on the track or ends of the press while pulling a proof.

The Power Presses

1. Use common sense while working around a press.
2. Stand erect while feeding. In this position it is not so likely that you will get your hands hurt.
3. *Use the safety switch for starting and stopping the press.*
4. Stop the press when you leave it for even a minute.
5. *Stop the press when you are going to pick up stock that has fallen under it.*
6. Do not attempt to retrieve a piece of stock that has fallen between the platen and delivery board.
7. Do not allow anyone around the press while you are working at it. Should someone come, just shut your press off and stand there. We will have the offender make up the time thus lost.
8. Do not attempt to clean the rollers or the ink disk while the press is in motion.
9. Do not attempt to oil the press when it is in motion.
10. Do not go behind the press when it is in motion.
11. Do not attempt to pull press proofs without permission.
12. *Don't take chances; you may lose.*

The Paper Cutter

1. *This machine must be operated only by one person.*
2. Be sure that the handle is way back and that no one is near it before getting your hands near or under the blade.
3. The blade is sharp, so extreme care must be taken not to run your hand along its edge.
4. When the handle is down, a small portion of it protrudes beyond the machine. *Be careful.*
5. When the clamp is way up, the edge of the blade is exposed. *Be careful.*
6. Allow no one around the cutter when you are operating it.

HIGH-JUMP AND POLE-VAULT STANDARDS

R. L. Ready,
High School, Batavia, Ill.

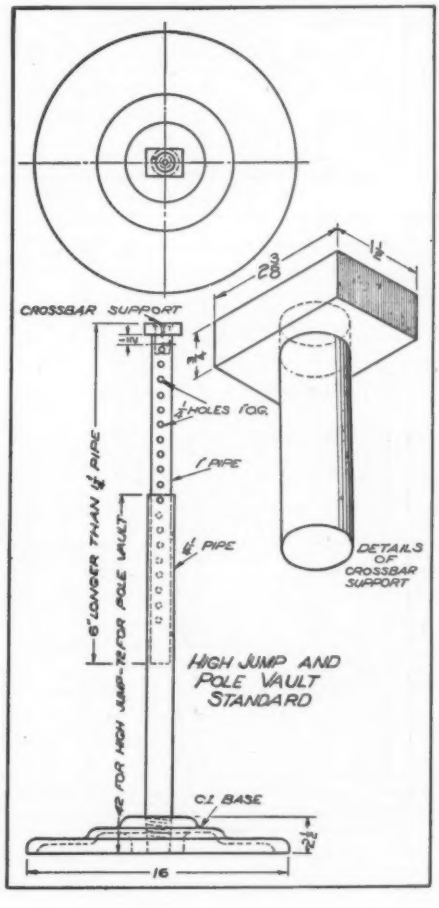
Six pairs of the jumping standards illustrated and described in this article were made by the boys in my general shop class. The construction involves patternmaking, laying out, cutting, threading, reaming and drilling pipe, and filling and painting. The finished standards are far superior to any wooden ones.

One of the advanced students turned out the pattern for the base. A local foundry poured the castings and tapped the hole for the 1¼-in. pipe. The base castings weigh approximately 20 pounds each. Secondhand pipe was used for the uprights.

The steps in construction are:

1. Cut the 1¼-in. pipe to the correct length (42 in. for high jump and 72 in. for pole vault). Thread one end of each piece. Ream the opposite end and drill a ¼-in. hole ½ in. from the end.

2. Cut the 1-in. pipe to correct length (6 in. longer than the 1¼-in. pieces.) Ream the ends. Drill and countersink a hole ½ in.



from one end of each piece. This is for the screw that holds the crossbar support. Measure 7 in. from the hole and drill ¼ in. spaced 1 in. o.c. to within 6 in. of the opposite end.

3. Make the crossbar supports. Use hardwood ¾ by 1½ by 2⅜ in. Bore a 1-in. hole, ½ in. deep in the center of each. Glue a piece of 1-in. dowel 3 in. long in this hole.

4. Screw the 1¼-in. pipes into the bases. Scrape, fill, and paint.

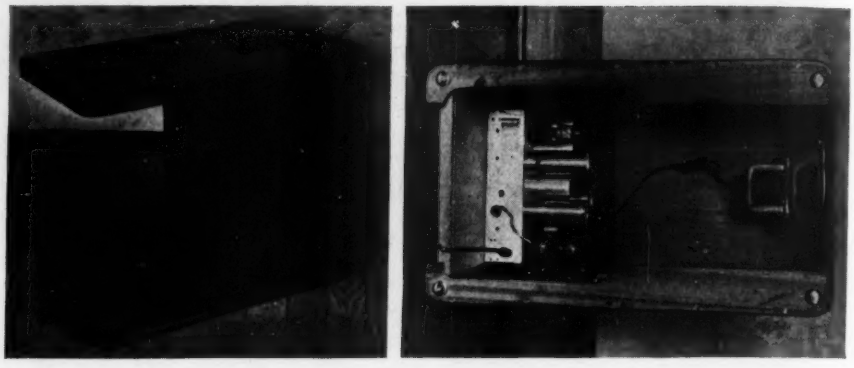
These standards are sturdy and solid. Adjustments in height are in one-inch intervals.

RADIO END TABLE

Chris Harold Groneman,
Industrial Education Department,
A. and M. College,
College Station, Tex.

Practically every boy has access to a mantle radio. The value and tone of a mantle radio can be greatly improved by transferring the chassis and speaker to a modern end-table cabinet such as the one illustrated herein. The resonance of the tone is improved because the long, loose fiber of the wood acts on the tone in the same way that the wood in a violin amplifies and deepens the tone of that instrument. It has been found that red Luaan, commonly known as Philippine Mahogany, produces a much better tone quality than many of the other woods.

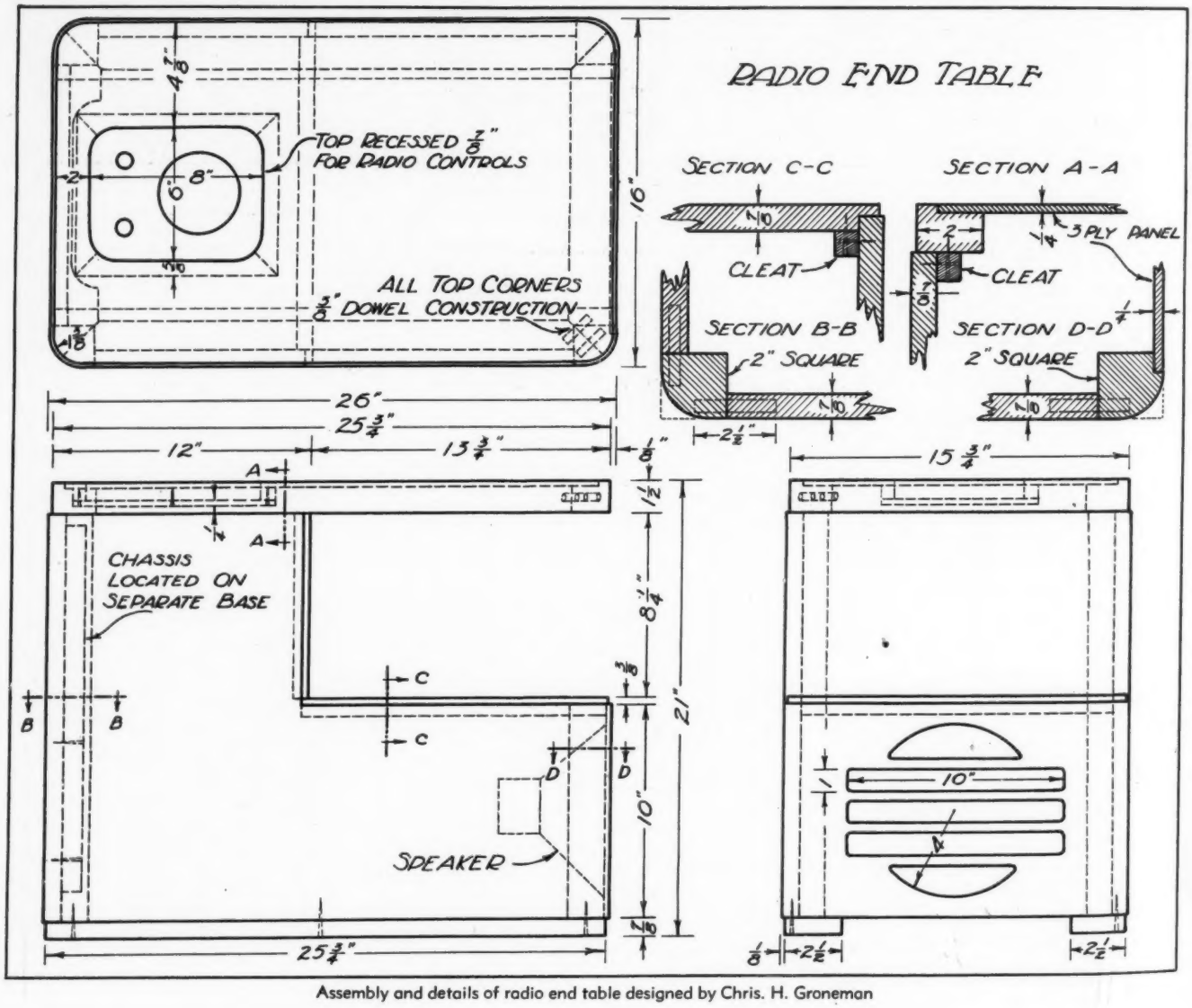
This unique project is a piece of furniture which will serve as an attractive end table because the radio controls are recessed in the top to allow magazines and books to be placed flat without affecting the operation of the radio.



Radio end table and view from bottom showing how radio chassis is fastened in place

The dimensions given in the working drawing may have to be altered slightly to accommodate the different size chassis and loudspeakers. Except for the top recess, the measurements are standard for most mantle sets. The depth, width, and length of this recess will depend upon the arrangement of the controls and dial of the individual radio.

With the exception of the top and speaker



Assembly and details of radio end table designed by Chris. H. Groneman

panels, and corner posts, the material used throughout this cabinet is of 1-in. or 4/4 stock. The corner construction of the cabinet is by means of four ⅜-in. dowels as indicated in section *B-B* on the working drawing. Allowance should be made for the flush fit of the ¼-in. three-ply speaker panel with the corner posts as shown in section *D-D*. If the two ends are glued together first, it will not be difficult to glue the sides into their respective places. It is suggested that the shelf and shelf back be made and installed next, by means of the cleat and screw assembly, as pictured in section *C-C*.

The cabinet is now solid and rigid to withstand the rounding of the corner posts with a plane, file, and sandpaper. A cardboard template of the proper curve will assist in making all corners uniform.

Section *A-A* shows how the top ¼-in. three-ply panel fits into the frame. Any of several types of corner construction may be used in making the top frame, however the dowel corner has proved very satisfactory with the students. After the top frame has been made, and the panel glued in, the corners may be rounded to fit the template or corners of the cabinet. The portion of the top to be cut away will depend upon the controls and dial of the radio, however, this is the logical time for this operation. The method for this recess is shown in the front and top views of the drawing. The top is held to the remainder of the cabinet with the cleat and screw assembly as shown in section *A-A*.

The feet are fastened to the cabinet with 1¾-in. No. 9 f.h.b. screws as indicated in the drawing. With the addition of four gliders, this compact radio end table can be moved very easily anywhere on the floor.

As may be observed from one of the halftone illustrations, the chassis is held in the cabinet by being fastened to a long baseboard, which in turn is fastened with screws to the back of the cabinet, thereby making it possible to pull off the control knobs and remove the radio chassis for tube replacement, or any other repair.

The working drawing and half tones show only one design for the speaker panel. This is purely optional, and may be changed according to the originality of the builder. The tone can be improved if a baffle board or heavy cardboard, 3/16 in. thick, be inserted between the speaker and the front panel.

After all necessary sanding, this unique project is now ready for the finish, which will be dependent upon the advice of the teacher and ability of the student.

DOUBLE-END END-MILL HOLDERS

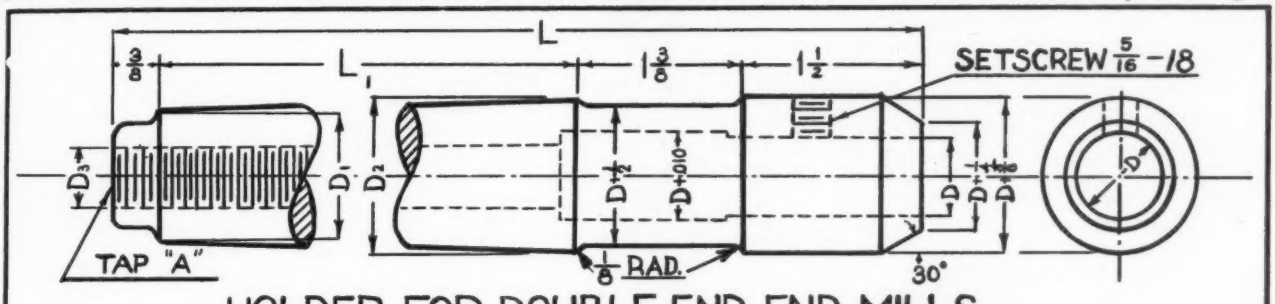
Milo P. Johnson,
California Polytechnic School, San Luis Obispo, Calif.

Often the vocational machine-shop teacher's initiative is taxed. Especially is this true when he is trying to keep the more advanced students working on projects that are useful and challenging, but still only cost a small amount. Accompanying this article is the drawing of end-mill holders which not only furnish a good project but also add to the shop's useful equipment.

Double-end end mills haven't been used to any great extent in industry until recently. Many school shops fail to use them because of the extra outlay for a set of holders. It takes six holders for the range of end mills from ⅛ in. to 1 in. All of us who have had to use end mills know that even with due care they are a fragile tool. With student use this tendency to break and burn end mills is often costly. Especially is this true if the tougher alloy steels are used such as the metal on which tungsten carbide tips are mounted. Since the end mills are inherently fragile and somewhat expensive, one should take advantage of the 25 per cent saving per cutting end which the double-end type affords. Other advantages of this newer type end mill have been pointed out as: a more rigid positive drive, added clearance around the holder for the smaller sizes, and the possibility of extending the mill further from the holder for special work.

Making these end-mill holders is an excellent job for a student who is somewhat advanced in lathe operation. It is not necessary to order special steel for the job; cold-rolled steel answers the purpose very well, although chrome nickel or some other alloy steel makes holders which last much longer. The instructor can have every student make one holder and check their time against one another, or he can have one student, if he is in the shop several hours a day, make a set of six, all having the same taper but with six different bores. The author believes the latter method is the best because it comes closer to the production-type training.

After several different ways of turning these



HOLDER FOR DOUBLE-END END MILLS

NOTE: ONE SET OF SIX HOLDERS IS REQUIRED FOR EACH TYPE OF TAPER. EACH SET OF HOLDERS IS MADE USING SIX VALUES OF "D" ($\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1 INCH) TO ACCOMMODATE THE SIX END MILL SHANK DIAMETERS.

TYPES OF TAPERS	TAPER PER FOOT	LENGTH OF TAPER="L1"	LARGE DIA. OF TAPER="D2"	SMALL DIA. OF TAPER="D1"	TAP DRILL SIZE="D3"	TAP SIZE "A"	TOTAL LENGTH="L"
BROWN-SHARPE NO. 13	.500	$7\frac{3}{4}$	2.072	1.750	$\frac{17}{32}$	$\frac{5}{8}$ - 11	10
BROWN-SHARPE NO. 12	.500	$7\frac{1}{8}$	1.797	1.500	$\frac{17}{32}$	$\frac{5}{8}$ - 11	$9\frac{3}{8}$
BROWN-SHARPE NO. 10	.516	$5\frac{11}{16}$	1.289	1.045	$\frac{17}{32}$	$\frac{5}{8}$ - 11	$7\frac{15}{16}$
BROWN-SHARPE NO. 7	.500	3	.725	.800	$\frac{5}{8}$	$\frac{3}{8}$ - 16	$5\frac{1}{4}$
MORSE NO. 3	.603	$3\frac{3}{16}$	.938	.778	$\frac{27}{64}$	$\frac{1}{2}$ - 13	$5\frac{7}{16}$
MORSE NO. 4	.628	$4\frac{1}{16}$	1.231	1.020	$\frac{17}{32}$	$\frac{5}{8}$ - 11	$6\frac{5}{16}$
MORSE NO. 6	.626	$7\frac{1}{4}$	2.494	2.116	$\frac{17}{32}$	$\frac{5}{8}$ - 11	$9\frac{1}{8}$

holders were tried it was found that they could best be done by roughing the outside diameters to within an eighth inch of their finished size. The holder was then drilled and carefully reamed for the bore. Next it was taken to the drill press and drilled and tapped for the setscrew. A short piece of scrap stock, held securely in the chuck of the lathe, was turned to the micrometer size of the bore. Then the holder was slipped over the turned piece, and a hollow-head setscrew tightened on it. The holder revolved true with the bore and not until then was the small end of the taper centered. After cutting the taper by the use of the taper attachment or by feeding the compound by hand, the chuck part was brought down to the finished sizes. When the holder was completed after being held in this manner, there was no question about the eccentricity of the bore and outer taper.

A large number of these finished holders can be used to an advantage. They can be used in the drill presses, lathes, and in the spindle and vertical head of milling machines. When holders are made for use in the drill press, the drilled and tapped hole for draw-in should be replaced by a tang end.

A HANDY MOUNTING FOR CIRCULAR REFERENCE AND DATA DISKS

Frank Bentley,
Clinton, Iowa

The very handy thin cardboard or composition reference disks used continually about the shop and drawing room, soon become soiled and worn through use. To obviate this, take two common thin cork tumbler pads or coasters. Take also two ordinary paper fasteners, straighten them out and place the pointed ends between the pads after having spread a coat of glue over the coasters. With the paper fasteners in place, press the coasters together and permit the glue to dry. Then bend the projecting ends of the fasteners up a trifle. This affords an excellent finger grip for picking up the pad.

Lengthening the life of the circular reference disk

Next, glue the lower half of the reference disk to the upper pad of cork. Cut a short piece of round pencil eraser and cement this to the revolving disk just a trifle below the indicator groove or slot. The tip of the finger can then be used to turn the revolving disk easily without actually touching the surface. The projecting ends are handy grips for the fingers for holding the device without touching the disks because the cork is made large enough to extend ⅛ to ¼ in. beyond the disks. In this way these handy gadgets are kept clean for a very long time, even if they are used continually.

TOOL RACK FOR THE MECHANICAL-DRAWING ROOM

Ralph W. Parker,
C. K. McClatchey Senior High School, Sacramento, Calif.

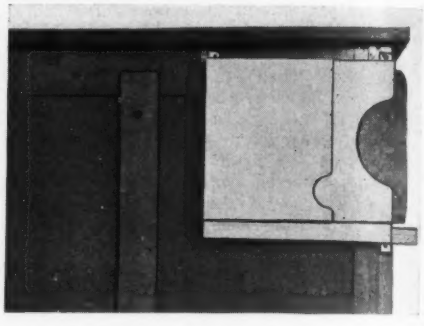
In a mechanical-drawing class of 32 students, the problem of checking mechanical-drawing equipment, and the placing of responsibility is a major one. The placement of equipment such as the T square, texts, triangles, and scales, often cause the instructor inconvenience and worry, especially where this type of equipment is used by several classes throughout the day.

The rack described herewith helps to solve this problem.

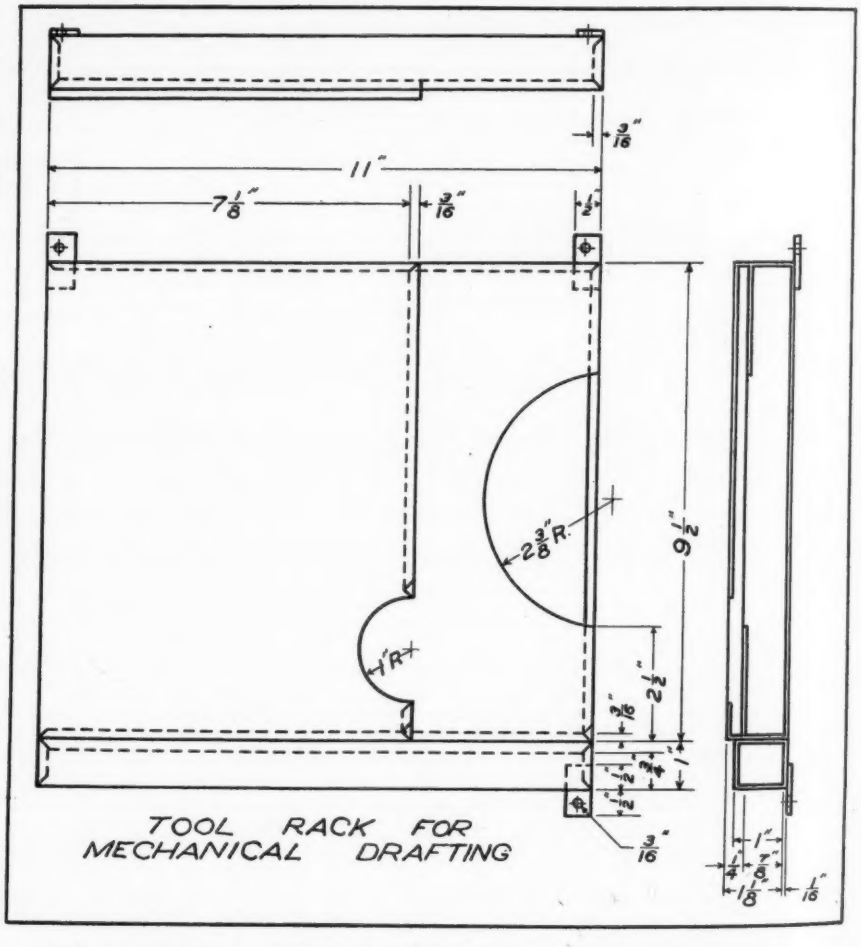
This tool rack provides a unit for the storage of texts used in mechanical and architectural drawing, as well as a place for lettering manuals. It provides a unit for the triangles, attached to the side of the text unit, and below the text unit is a boxlike compartment for the scale.

In the construction of this tool rack, 28-gauge furniture steel was used. The unit used for the texts, and the unit on the side used for the triangles are locked together top and bottom with a box-lock seam. The edges of these units are folded in with a 3/16-in. single hem. The unit for the scale is a square tube using the box-lock seam and folding in a 3/16 single hem on the end to protect the edges. The other end of this tube is closed with a square of metal folded in on all four edges with a box-lock seam. This scale unit is soldered below the text unit, and small square tabs are soldered at each corner to provide means for attachment to the desk. Note that a cut-away space is allowed to withdraw the texts and triangles, and that the scale compartment is only 11 in. deep, allowing easy access to the scale. After the tool rack is completed it is given a spray coat of aluminum paint.

The T square is hung on a hook near the rack on the student's desk and all equipment is stamped with the school initials, and the individual desk number.



The rack attached to the drawing board



This tool rack was designed by Ralph W. Parker, drafting instructor and constructed by industrial-arts students under Adolph W. Ehrhorn, metal-shop instructor

After using this tool rack for mechanical-drawing equipment in our two drawing rooms on 64 desks, we have found it to be of great value in placing responsibility for the use of mechanical-drawing equipment directly upon the shoulder of the individual student. It saves the student's time in getting ready to work and in putting away his equipment at the end of the period, and his desk is left neat and clean for the student of the following period.

CARE OF PAINTS AND PAINT BRUSHES IN THE SCHOOL SHOP

Einar E. Siro,
Industrial Arts Instructor,
Minneapolis Public Schools,
Minneapolis, Minn.

The proper care of painting equipment in the school shop is a problem with which practically every teacher of industrial arts is confronted. The author has considerably increased the efficiency of his paint shop by the use of a simple device of his own design which minimizes the possibility of contamination of paints through the use of a dirty stick for stirring or of a stick previously used in a different colored paint, or through the use of a brush that may have traces of another paint in it. With this device as a part of the shop equipment, students are not apt to leave paint brushes where they will dry without being cleaned or leave the covers off the paint cans, thus causing thickening and scumming of the paint.

Paint is purchased in pint cans. A smaller size has been found impractical, and a larger size is not used fast enough to prevent the paint from drying out and being wasted. A band one inch wide is painted around the top of each can with the color of the paint it contains. A spot is also painted on the cover of each can. By use of these markings, the student can determine the exact color of the contents without opening the can, and with the cover marked, he will seldom, if ever, put the wrong cover back on the can.

Brushes are kept in old tin cans or similar receptacles which are given a thorough cleaning and then painted to correspond to the colors of the paints in the paint cans being used. One container is used for each can of paint. Brush handles are painted with the color of paint they are to be used in. A small brad is driven into the handle of each brush and the head of the brad turned downward so that it hooks over the edge of the can, suspending the brush ¼ to ½ in. from the bottom. If allowed to rest on the bottom of the container the bristles of a brush will bend out of shape, thus decreasing the efficiency of the brush. Sediment from the bottom of the container will also be picked up by the bristles if the brush is not suspended.

The brush containers are filled with a mixture of turpentine and linseed oil, to such a depth that only the bristles of the brush are immersed in the liquid. When more than this amount of liquid is put in, the core of the brush (that is, the part of the brush handle that fits into the ferrule or metal band which holds the handle and bristles together) absorbs a part of the liquid, swells and cracks, thereby ruining the brush. A student is appointed to check on the level of the liquid in the cans, to see that the brushes are hung up properly and the covers on the paint cans are all on tightly at the close of each class period.

If brushes are not going to be used regularly, it is advisable to wash them with turpentine or kerosine and then soap and water, press the bristles to proper shape and then suspend them so they can dry properly. All brushes should be thoroughly cleaned at the end of the school term.

Box for paint and brush containers

Stirring rods are made out of ⅛ by ⅜ by 8-in. strap iron. A small hole drilled in one end indicates the handle. Rods are painted the color of the paint they are to be used in. The colored rods discourage the use of dirty sticks for stirring paints, or of the same rod for several colors of paint. To avoid picking up dust and dirt which would later be mixed into the paint, the rods are kept in the respective brush containers.

A partitioned box is used to keep the paint and brush containers in pairs. The box should be made to hold as many sets as desired. The author has two boxes of the type shown in the illustration in use in his shop. They are made of ⅜-in. lumber and have an inside depth of 2¼ in. Two slats are nailed to the bottom of the box to keep it from coming in contact with dirt and moisture. The ends of the box are equipped with handles to facilitate moving from paint table to storage cabinet or from shop to shop.

To prevent covers of paint cans from being pried out of shape, specific instructions are given to open a paint can by prying in several places around the cover. Students are shown the proper way of stirring paint, wiping off the stirring rods, dipping the brush approximately 1/3 the length of the bristles into the paint, removing excess paint from the brush by pressing it on the inside of the paint can before using, and replacing the cover on the paint can when they are through painting. This prevents the paint from being dried up and spilled on the outside of the can.

With the paint can and cover, stirring rod, brush container, and brush all painted the same color and kept in pairs in the partitioned box, specific instruction given to all students on the care of the paint department, and a student foreman in charge, very little supervision is required on the part of the instructor. Other finishing materials can also be taken care of by this method.

SAFETY-FIRST INFORMATION SHEET

Earl F. Griswold,
James Monroe High School,
Fredericksburg, Va.

The following information sheet on general safety rules is the result of a need for the development of a safety-conscious attitude in the mind of the student at the beginning of the school year. The rules are very general in character and it is assumed that specific safety points will be covered in like manner when the need arises. The primary purpose of this sheet is to govern the general everyday working conduct of the student.

Each student is given a copy of this sheet and there is a definite set of questions for him to work out. The last question is in the form of a pledge which the student is expected to sign and which will be filed away for future reference. A general discussion of the rules while making a tour of the shop might prove to be an effective method of getting across the correct ideas.

Directions to the Student

Industrial concerns spend great amounts of money each year to prevent accidents because they are costly in time and money. Many industrial concerns print sets of rules and require workers to sign a statement that they have read the rules carefully and agree to abide by them. Whenever you decide to enter upon your life's work, regardless of where it may be, you will be expected to obey safety regulations.

Read the rules, which follow, very carefully and then answer the questions at the end of the sheet. Hand in the questions with your signed statement that you will live up to these rules to the best of your ability. Let's prevent accidents, not doctor them.

General Safety Rules

1. Always place oily rags, waste, or other inflammable materials in covered metal cans or suitable receptacles.
2. Horseplay will not be permitted. Innocent horseplay often results in serious injury. Stick to your job.
3. If an accident, no matter how small, does happen to you or to someone else, report it at once to the instructor.
4. If you find a tool, machine, or any other piece of equipment out of adjustment or in need of repair, report it at once to the instructor.
5. Never start any machine without the permission of the instructor.
6. Never talk to anyone while he is operating a machine. To divert his attention for one second may cause him to be seriously injured.
7. Loose clothing is always dangerous in a shop. Roll up your sleeves and tuck your tie in your shirt.
8. Keep the floor clean of nails, blocks of wood, scraps of metal, or any other article obstructing the working space. Someone may trip or run a nail in his foot.
9. Never put your hands in your mouth or rub your eyes when your hands are dirty. Wash your hands frequently.
10. Running or jumping in the shop will not be permitted.
11. Throwing anything is dangerous to you and to other students and will not be allowed.
12. All wiring will be considered as dangerous until proved otherwise.
13. In taking material from the stock racks, do not undermine the pile or otherwise make it dangerous.
14. Never use any tool or machine for any other purpose than it is designed for.
15. THINK.

Assignment

1. Why do you think oily rags, waste, and inflammable materials should be placed in covered metal containers?
2. What is meant by the term "horseplay"? Is it dangerous? Why?
3. What might result if you had oil stain on your hands and put your hands in your mouth or rubbed your eyes?
4. Why are broken tools and equipment in need of repair a hazard?
5. Rule No. 15 says, "Think." In what ways might you help to promote safety by observing this rule?

6. At the end of your assignment sheet write out the following pledge and sign your name to it.

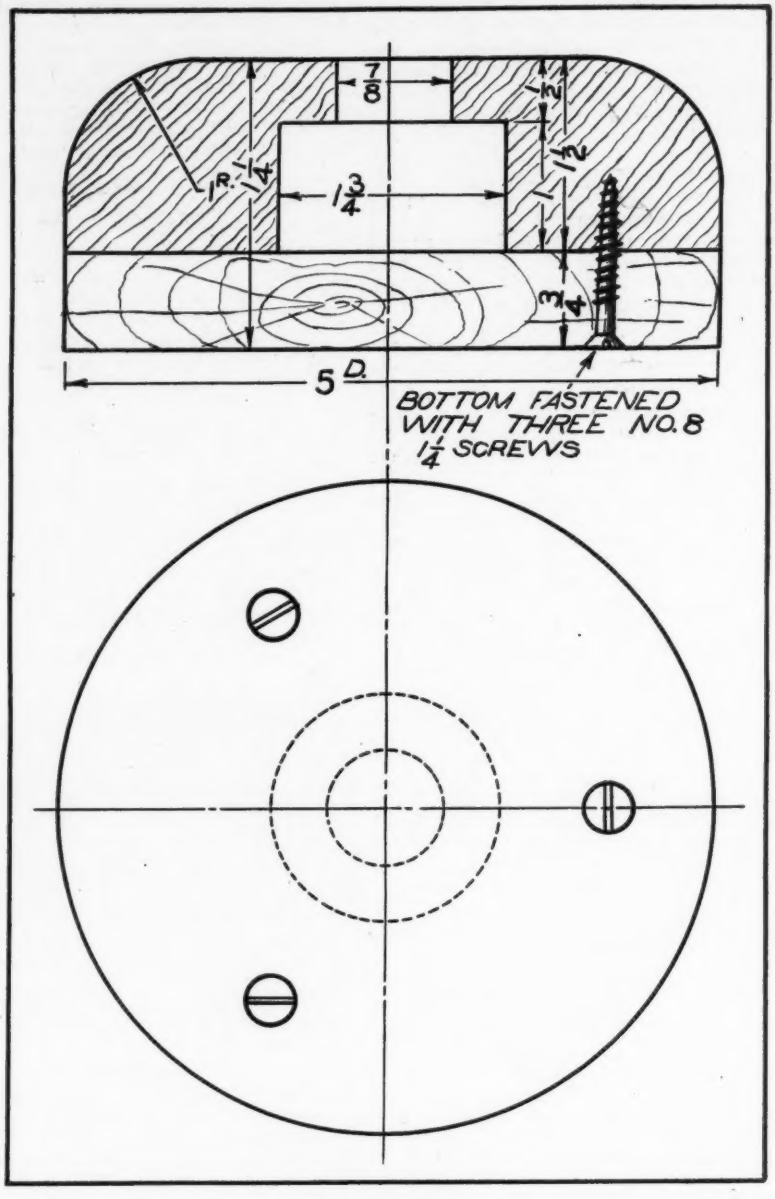
I have read the rules over carefully and fully understand them. I shall endeavor to live up to them to the best of my ability.

Signed.....

INK-BOTTLE HOLDER

William Fawcett,
State Teachers College,
California, Pa.

The practical ink-bottle holder herewith described can be produced on the lathe in a few hours time. It has been found very useful in the drafting room.



Ink-bottle holder

Take a piece of ¾ by 5½ by 5½-in. walnut or any other wood that may be preferred, fasten it to a faceplate with screws, and turn it down to a 5-in. disk for the bottom. Then take another piece, 1⅝ by 5½ by 5½-in. lumber of the same kind as the bottom disk, and turn it into a 5-in. disk, 1½ in. thick. Turn the 1-in. rounding at the top, and sand and finish both pieces on the lathe.

Use a French finish on this job. To do this, make a small pad of cloth and put some linseed oil on it. Then dip it into white shellac, and while the lathe is going, cover the job with the mixture. Then with a slight pressure on the rag go over the work until the finish is dry. Repeat this every 24 hours till a smooth glossy finish has been obtained.

Bore a ⅞-in. hole down from the top ½ in. deep as shown, and bore a 1¾-in. hole from the bottom to meet it. After putting the ink bottle in place, fasten on the bottom with three No. 8 1¼-in. f.h.b. screws.

LACQUER FOR LATHE PROJECTS

A. L. Toews,
La Sierra College,
Arlington, Calif.

Clear lacquer makes a most satisfactory finish for lathe projects. After the project has been thoroughly sanded and finished off with 3/0 sandpaper, apply a thin coat of lacquer as follows:

1. Pour a small quantity of lacquer into a small, shallow container. It is very important that the lacquer (spraying lacquer) be poured out in small quantities to prevent its gumming, as it quickly loses its value as a finish when left in an open container.

2. Dip one corner of a lint-free cloth into the lacquer.

3. Start the lathe and quickly brush the cloth with lacquer over the surface.

4. With a soft lint-free cloth buff the surface as quickly as possible after the lacquer has been applied. Be careful not to burn the finish. Buff only long enough to polish well.

About six coats applied thus will give a very beautiful glossy finish.

In case you are not quick enough between the application and buffing, and a few gummy spots have developed, simply stop the lathe, dip the cloth into fresh lacquer and rub over the gummy spots. This removes them quite easily. Applying too much lacquer at once will also develop gummy spots. Therefore, use it sparingly.

Another point to remember is that this finish will be better and more beautiful if you allow the coats to harden for three or four hours between coats. If this is too tedious, half of the coats may be applied in succession and the other half after the hardening interval.

After the last coat of lacquer has been applied, let the finish harden overnight and then apply a good coat of wax.

This type of finish has a very definite advantage over a French polish in that it will not turn white when water or other substances come in contact with the finished surface. It is also a much more durable finish.

Colored spraying lacquers may be used in the same way, but probably not with the same satisfactory results.

SHARPENING THE PLANE IRON ON A HAND-POWERED GRINDER

William Fawcett,
State Teachers College,
California, Pa.

Home shopworkers frequently find it troublesome to sharpen plane irons on a hand-powered grinder. This is natural seeing that man has been provided with only two hands with which to do many operations. To make the job of grinding a plane iron easier, and at the same time assure an even bevel on the iron, turn over the plane iron cap, fasten it to the plane iron and use the resulting flange as a track against the tool rest. This makes it easier to work with one hand, do a better job of grinding, and at the same time supply the power to the grinder with the other hand.

SIOUX GHOST SHIRTS

W. Ben. Hunt,
Hales Corners, Wis.

Most of the Sioux who took part in the "battle" of wounded Knee (December, 1890) wore ghost shirts. Just before the "battle," Yellow Bird, a medicine man, told the Indians that these shirts were "medicine" against the white man's bullets. This did not prove to be the case as all the Indians, men, women, and children, were shot down. But Sitting Bull, then a Chief of the Sioux, became a leader in the ghost dances which became very popular among many of the plains Indians.

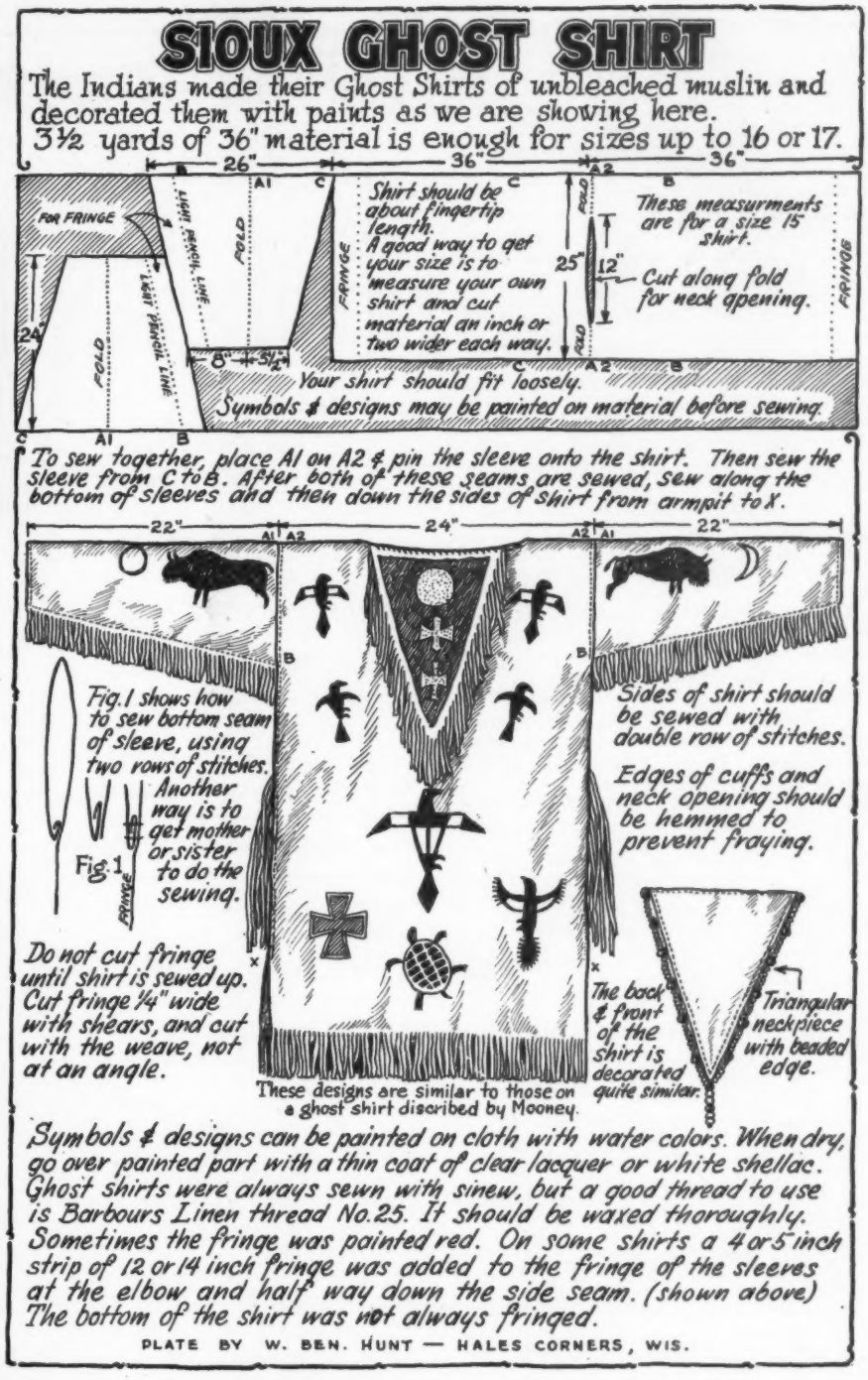
The ghost shirts were made similar to the description given on the plate, but, of course, no two of these shirts were ever made alike as far as the decorations were concerned. Some of these old muslin shirts look for all the world as though they had been made of buckskin. Some were said to have been smoked to give them a buckskin color. The shirt shown on this page, though made of muslin,

Muslin shirt with beadwork painted on

is decorated like a buckskin war shirt. The muslin was first dipped in ecru dye to give it the proper tint, then run through a clothes wringer about 10 times and then hung up to dry a little. While still damp it was then ironed. The small wrinkles caused by wringing could not be ironed out, but they gave the material a very real buckskin-like appearance.

If carefully done the painted "beadwork" designs look very nice. One shirt seen at Hardin, Mont.. had real beadwork sewed on the shirt, but most of those seen were painted.

Indian costume with muslin shirt


SIOUX GHOST SHIRT
The Indians made their Ghost Shirts of unbleached muslin and decorated them with paints as we are showing here.
3½ yards of 36" material is enough for sizes up to 16 or 17.
26"
36"
36"
FOR FRINGE
LIGHT PENCIL LINE
FOLD
24"
8" + 5½"
Shirt should be about fingertip length. A good way to get your size is to measure your own shirt and cut material an inch or two wider each way.
25"
12"
These measurments are for a size 15 shirt.
Cut along fold for neck opening.
FRINGE
Your shirt should fit loosely.
Symbols & designs may be painted on material before sewing.
To sew together, place A1 on A2 & pin the sleeve onto the shirt. Then sew the sleeve from C to B. After both of these seams are sewed, sew along the bottom of sleeves and then down the sides of shirt from armpit to X.
22"
24"
22"
Fig.1 shows how to sew bottom seam of sleeve, using two rows of stitches.
Another way is to get mother or sister to do the sewing.
Fig.1
Sides of shirt should be sewed with double row of stitches.
Edges of cuffs and neck opening should be hemmed to prevent fraying.
Do not cut fringe until shirt is sewed up. Cut fringe ¼" wide with shears, and cut with the weave, not at an angle.
These designs are similar to those on a ghost shirt discribed by Mooney.
The back & front of the shirt is decorated quite similar.
Triangular neckpiece with beaded edge.
Symbols & designs can be painted on cloth with water colors. When dry, go over painted part with a thin coat of clear lacquer or white shellac. Ghost shirts were always sewn with sinew, but a good thread to use is Barbours Linen thread No.25. It should be waxed thoroughly. Sometimes the fringe was painted red. On some shirts a 4 or 5 inch strip of 12 or 14 inch fringe was added to the fringe of the sleeves at the elbow and half way down the side seam. (shown above) The bottom of the shirt was not always fringed.
PLATE BY W. BEN. HUNT — HALES CORNERS, WIS.

As the best grade of unbleached muslin can be bought for less than 15 cents per yard, a fine ceremonial shirt, including large beads for the triangular flaps at the front and back of the neck opening, may be made for less than 75 cents.

SMITHING COAL

J. H. McCloskey,
Senior High School,
Lakewood, Ohio

For years smithing coal has been sold to schools throughout the country for from 10 to 15 dollars a ton or even more in places farther from the mines. For several years it has been difficult to get smithing coal and what we have got has ofttimes been very poor. Two years ago three different instructors complained about the coal and I found that their criticism was well founded. I then recalled the fact that the near-by steel plant always seemed to have satisfactory smithing coal. I telephoned to the superintendent of the steel plant who gave me the name of the firm from whom they purchased their coal.

I found that the coal that the steel company used for smithing coal was the highest grade Pocahontas screenings and sold at the mine for $1.80 a ton by the carload. A local dealer delivered this grade of coal to the school for $5.50 a ton and it has proved to be the best smithing coal that we have ever had.

DAYLIGHT PROJECTION TUNNEL

Edwin J. Reinel,
Council Bluffs, Iowa

Very often it is not desirable to darken a classroom for projection purposes. The students may need light for taking notes, and lengthy projection work in totally darkened rooms may interfere with the proper ventilation of the room. To overcome such difficulties, daylight projection may be utilized by using the projection tunnel described herewith.

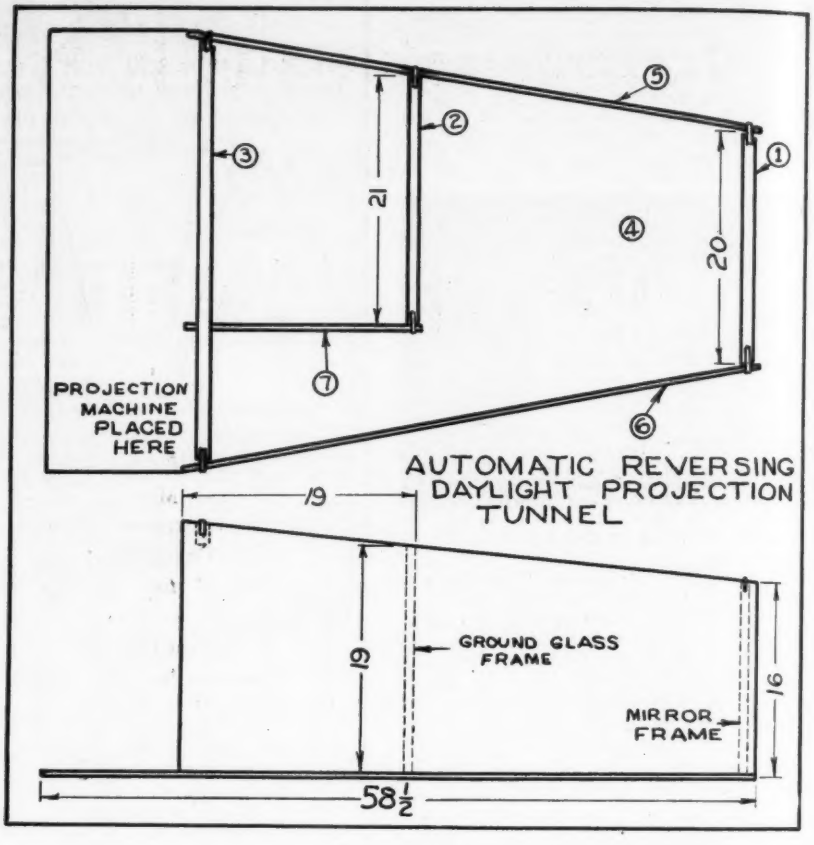
It is very compact and can very easily be used in any class or shop room. It may be set up so all of the pupils in the average classroom, seated at their regular seats, may see the picture which is reflected from the mirror onto the ground glass.

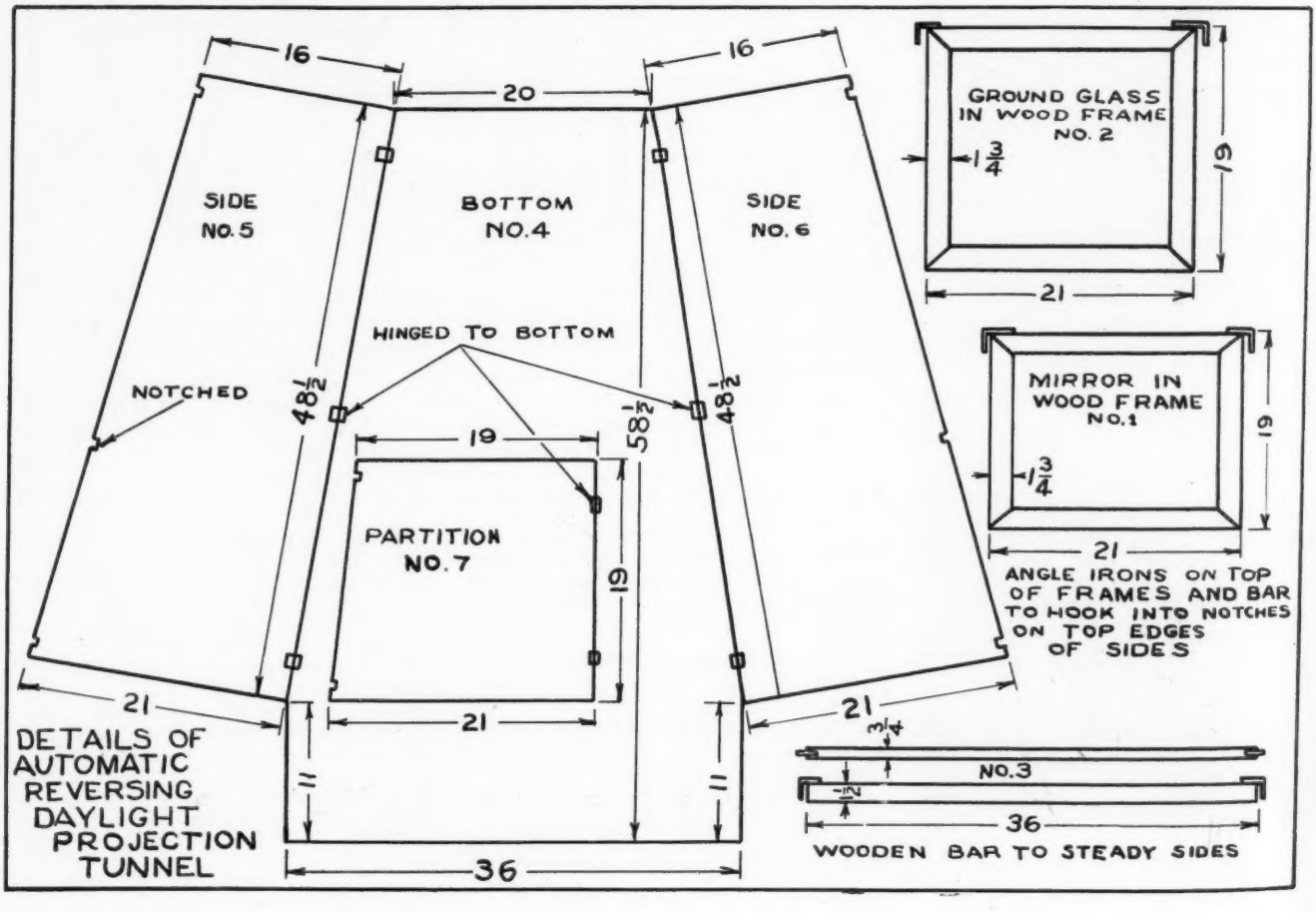
With the mirror placed in the narrow end of the tunnel, and the machine placed at the right side of the wide-open large end of the tunnel, the pictures are flashed to the mirror and then are reflected back to the ground glass where they may be viewed by the pupils who are looking into the wide open end of the tunnel and to the illustrations on the ground glass.

The teacher can sit or stand to operate the machine and at the same time be near enough to point out and discuss the important parts and clear up points when there is any question.

The bottom of the tunnel is made of ¼-in. fir panel, 36 in. in width at the front, tapering on both sides to 20 in. in the rear. The bottom is 58½ in. long. If more room is needed in the front for a larger machine, the front can be extended and a longer bottom can be made.

(Continued on page 22A)





Outstanding Results In Projects

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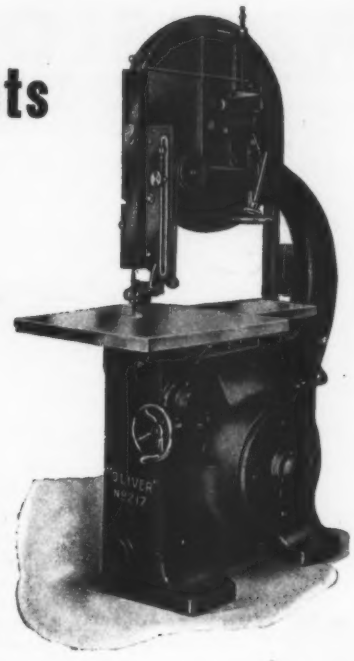

In the Holland High School at Holland, Michigan the woodworking department is fully equipped with Oliver Machinery. In this city of furniture factories the school uses the type and kind of equipment that will train the students in the art of furniture making with equipment used in industry. Mr. E. E. Fell, Superintendent of Schools, is enthusiastically interested in the shops. Mr. Ed. Donivan, Supervisor, is in direct charge of the work in the shops which includes the making of furniture projects such as illustrated—made for the schools or the pupils only. The following machines are in constant use and giving excellent results in Holland:

Oilstone Tool Grinder—Universal Saw Bench—Motor-on-shaft Band Saw—12″ Hand Planer and Jointer—Speed Lathes—15″ Disk Sander—Mortiser—6″ Jointer—Buss Surfacer—Wood Trimmer.

The above Band Saw Machine is included in the equipment in Holland, Michigan shops. This machine has found wide acceptance in woodworking departments of school shops because of its safety and the very efficient work performed by it. The features that are outstanding are the automatic brake for the upper wheel; self-locking tilting device for the table; foot brake which shuts off the current and the dust collecting system.

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Wood Lathes	Glue Heaters
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Specifications—Literature—Prices are yours on request.

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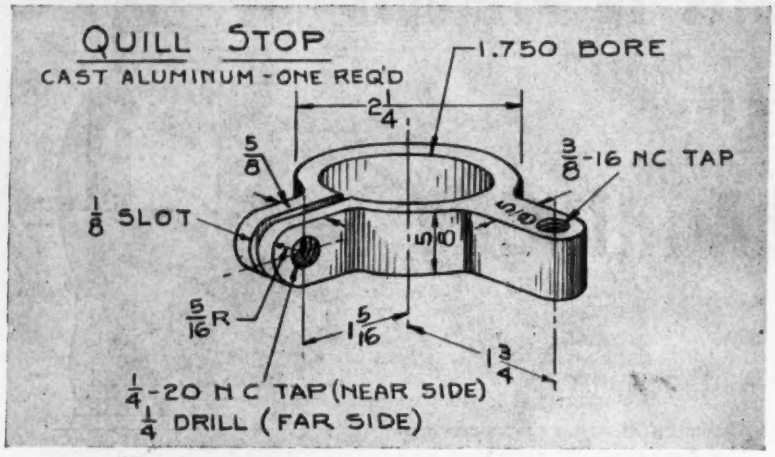

PROBLEM: ***Ask your students to draw the correct orthographic views of this QUILL STOP.***

SOLUTION: ***For your convenience Dixon offers a free blueprint showing the problem's solution. THIS OFFER LIMITED TO 30 DAYS. Write to address below for blueprint No. 128-J9.***

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A Correction

Unfortunately, some of the type material was misplaced in the article, "Radio and Industrial Arts," by Carleton E. Beck, Lockport, N. Y., which appeared in the June, 1941, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION on page 260.

If the reader will transpose the paragraph beginning, "With a box of assorted . . ." down to "schematic diagrams," found immediately beneath Figure 8 on page 261, and insert it at the bottom of the center column on page 260 between the end of the second paragraph under "7," and the paragraph starting with "Example: A one-tube all-wave receiver," the article will read correctly.

Also, at the bottom of the first column on page 261 in paragraph 6 where reference is made to Figure 10, it should really have been Figure 11.

DAYLIGHT PROJECTION TUNNEL

(Continued from page 310)

Using a one-piece bottom, the tunnel can be placed at the most convenient place in the room because a special standard is not needed.

The sides consist of ¼ by 48½-in. fir panels with one edge straight and the other edge tapering from 21 in. in width at the front to 16 in. in width at the back. The straight edges of the sides are hinged to the tapering sides of the sides of the bottom. Hinges are bolted in place.

The partition is a ¼ by 19 by 21-in. fir panel, tapered on one side from 21 in. to 19 in., and this hinges to the bottom to hold the ground-glass frame, and to separate the machine from the ground-glass frame.

The mirror frame is made of ¾ by 1¾-in. lumber large enough to hold a 12 by 18-in. mirror. The frame is made strong enough so it will not break easily. A piece of ¼-in. panel can be nailed to the back of the frame to give it strength.

The ground-glass frame is made of ¾ by 1¾-in. lumber large enough to hold a 16 by 18-in. piece of glass. The frame can be reinforced at the corner with corner blocks or corner irons.

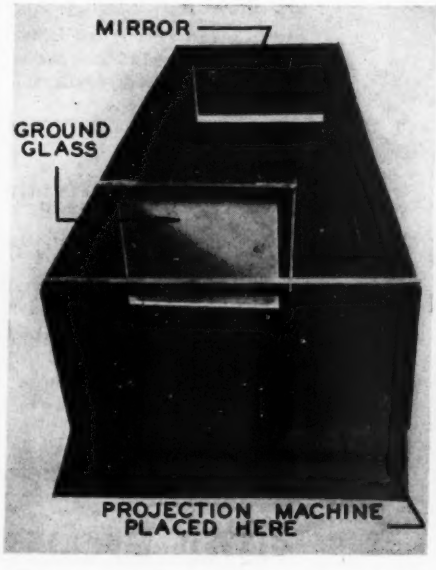
A brace ¾ by 1¾ by 36 in. is used across the open end of the tunnel to steady the sides and partition when the tunnel is in use.

The two frames and the rod are equipped with hooks made of angle irons so that they can be hooked into place into the notches shown on the drawing.

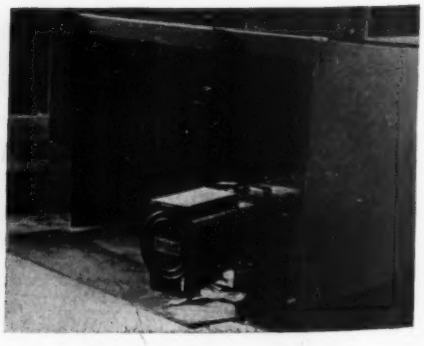
All of the inside walls are painted a dull black. To obtain maximum clearness, it may be necessary to place a dark oilcloth or another panel over the top for a covering after the tunnel is set up ready for use.

When stored, the partition can be folded toward the inside, and the sides then folded over the partition flat to the bottom. With the hinges attached on the inside this makes a compact unit for storing. The glass frames and brace take up little space. In less than five minutes this tunnel can be set up ready for use.

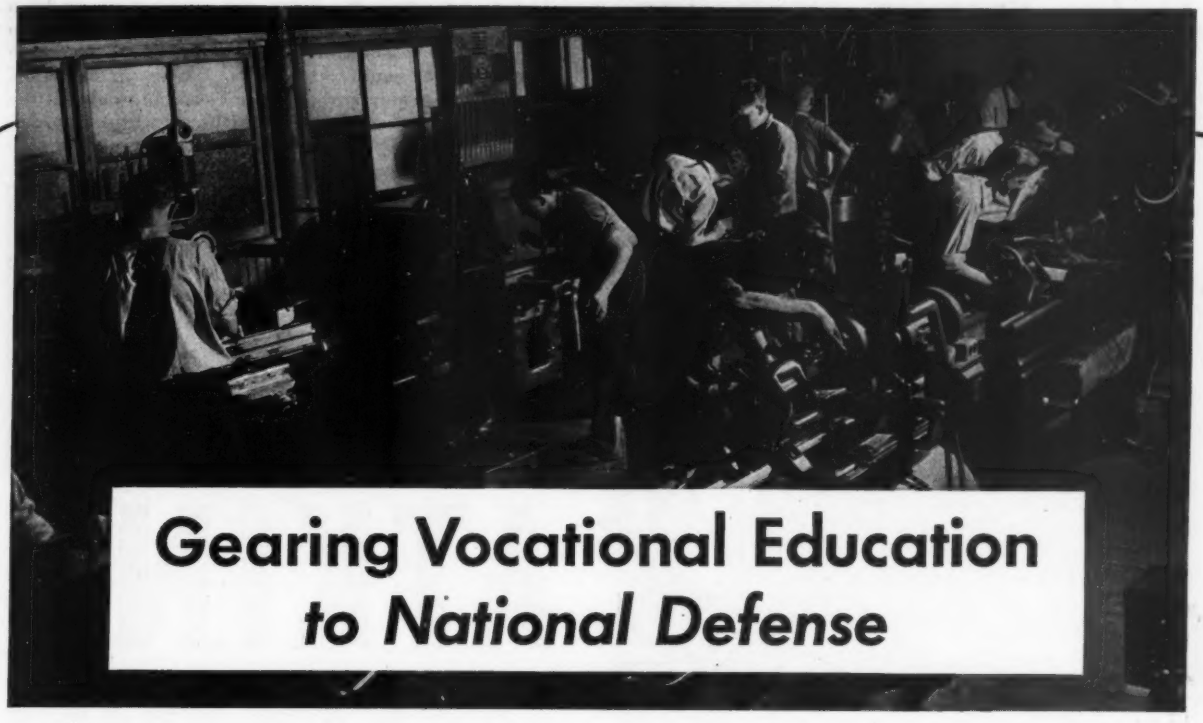
(Continued on page 24A)



This view is the assembled tunnel looking into the wide open part



This view shows the side-end view of the machine in place in the tunnel



Gearing Vocational Education to National Defense

Within the last few months, vocational education has been given its biggest job—to train thousands of mechanics, technicians and engineers for industrial production . . . and to do it *now*.

Tremendous progress has already been made. All over the country, schools and industry are working together in the National Defense Training Program. And helping vocational education do this job is the Mimeograph photochemical printer—basic equipment for the industrial arts—providing a new method of making duplicate copies of ink tracings in quantity at very low cost.

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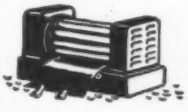

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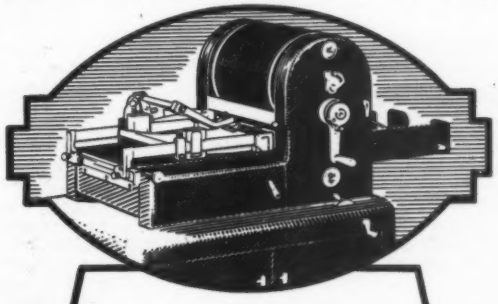

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The manual training instructor knows that as boys make rapid progress in their work, they are stimulated to even greater interest and effort. That's why so many teachers recommend Atkins Saws. These quality saws, made to highest standards of design and materials, let the pupil concentrate on the project without wasting time and losing zest for the task trying to do an acceptable job with inferior tools. Their rugged construction, equal to the often rigorous punishment of inexperienced hands, pleases economy-minded school officials, too. Put "Atkins" on your next requisition for Circular, Band or Hand Saws.

ASK ABOUT THE ATKINS DEMONSTRATOR

Atkins No. 53 Hand Saw is furnished also in a demonstrator model showing a variety of point sizes, each filed and set both right and wrong, as examples to follow. Write for details.

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...Teach them with ATKINS Silver Steel SAWS

DAYLIGHT PROJECTION TUNNEL—BILL OF MATERIAL

(Continued from page 22A)

No. Required	Name	Material	Size
1 pc.	Bottom	Fir panel	¼ x 36 x 58½ in.
2 pc.	Sides	Fir panel	¼ x 21 x 48½ in.
1 pc.	Partition	Fir panel	¼ x 19 x 21 in.
1 pc.	Rod	Any wood	¾ x 1¾ x 36 in
1 pc.	Frame	Any wood ground-glass frame	¾ x 1¾ x 80 in.
1 pc.	Frame	Any wood mirror frame	¾ x 1¾ x 68 in.
1 pc.	Ground glass		16 x 18 in.
1 pc.	Mirror		12 x 18 in.
6 pc.	Angle irons		
8 pc.	Strap hinges		
	Dull black paint		
	Paint for outside		

NEW PUBLICATIONS

Farmer's Shop Book

By Louis M. Roehl. Cloth, 422 pages, 6¼ by 9⅛, illustrated. Price, $2.48. Published by the Bruce Publishing Co., Milwaukee, Wis.

This well-known text, of which this is the sixth and enlarged edition, provides a well-balanced shop course for the vocational departments of rural high schools.

Based on the fundamental idea that the farmer definitely needs a knowledge of and a skill in woodworking, metalworking, and the maintenance of farm machinery and agricultural tools in efficient operation and good order, the author has proceeded to treat a wide field with admirable clarity and brevity.

The 13 divisions into which the book has been divided treat the subject under the following headings: grinding the farm tools; fitting saws; carpentry and woodworking; the farm workshop; community workshop; shop and classroom for department of vocational agriculture; painting, repairing, and refinishing furniture; ropework; harness repairing and belt lacing; fitting farm-tool handles; equipment and soldering; working cold metal; forging; and index.

Mathematics

By John W. Breneman. Cloth, 6¼ by 9¼. 207 pages. Price, $1.75. Published by McGraw-Hill Book Co., New York, N. Y.

This book is one of a number of books making up an industrial series prepared especially for adult-education classes. It is designed to give the student a review of the application of the simple arithmetical operations with whole numbers, fractions, and decimals.

After this review, the students are introduced to powers and roots, areas and volumes, formulas, simple algebra and algebraic equations, geometrical construction, trigonometry, and logarithms.

Mechanics

By John W. Breneman. Cloth, 6¼ by 9¼. 139 pages. Price, $1.50. Published by McGraw-Hill Book Co., New York, N. Y.

This book belongs to the "Industrial Series" prepared for adult-education classes. It presents the fundamental principles of mechanics in terms understandable to the practical men who are likely to attend adult-education classes.

Such subjects as the resolution and equilibrium of forces, the simple machines, bridge and roof trusses, the screw, pulleys, gears, inclined plane, center of gravity, moments of inertia, motion and velocity, force and acceleration, curvilinear motion and rotation, and work, energy, and power are illustrated and described. The book also contains numerous problems.

Metal Projects for Industrial-Arts Shops

Paper, 6 by 8¾, illustrated. Issued by the Dept. of Public Instruction, Vocational Division, Trenton, N. J.

A bulletin containing 16 photographs, working drawings, and job sheets which were prepared by teachers attending a professional improvement class under the direction of Robert A. Campbell, supervisor of industrial education, Vocational Division of Industrial Education, Vocational Division of the New Jersey Dept. of Public Instruction.

The projects include: cigarette boxes, scroll-type cigarette holder, ivy bowl, cigarette tray, candle holder and snuffer, table lamp, jardiniere, electric lanterns, refreshment stand, glass and tile-top tables, nest of tables, and folding-leaf table.

MISCELLANEOUS BOOKS

Among the books received which may be of interest to shop teachers are the following:

Annual Report of the United States Commissioner of Education

This is for the fiscal year ending June 30, 1940. It is obtainable from the Superintendent of Documents, Washington, D. C. Price, 20 cents.

Dramatizations in Safety Education

This is an annotated bibliography. It is obtainable from the National Education Association of the United States, 1201 Sixteenth St., N.W., Washington, D. C. Price, 25 cents.

Report of the United States National Museum

This is for the fiscal year ending June 30, 1940. It is obtainable from the Superintendent of Documents, Washington, D. C. Price, 15 cents.

(Continued on page 28A)

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Reg. U. S. Pat. Off.

SIMMONS Micro-Speed turret screw machines, lathes and millers are the ideal tools for vocational training purposes. They are offered with three distinct advantages:

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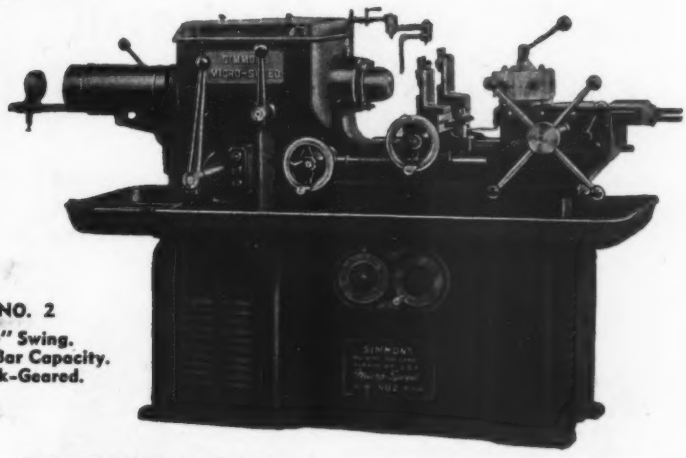

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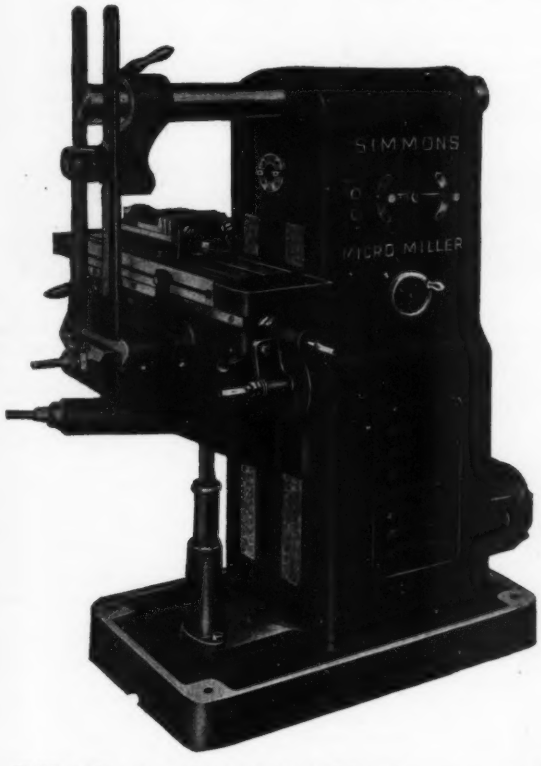
14" Swing.
1¼" Bar Capacity.
Back-Geared.

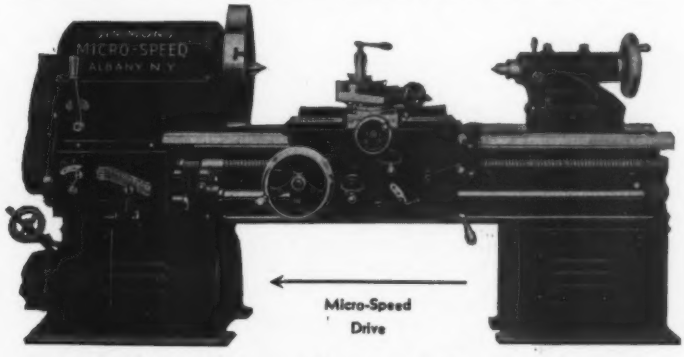
THIS TURRET LATHE has been designed with the greatest simplicity. Production tooling equipment adaptable to other standard turret lathes of similar size is also applicable to the Simmons machine. The Micro-Speed Drive offers a range of spindle speeds up to 1500 RPM by a mere turn of the handwheel, aided by the Selector Dial Control. A spindle brake stops and locks the spindle under all operating conditions.

New cabinet base. Spindles mounted on Timken Precision Tapered Roller Bearings. Levers within immediate reach of operators. Head cast solid with bed, insuring rigidity, *Plain and back-geared.*



THIS NO. A-1 PLAIN MILLER offers a range of spindle speeds from 38 to 500 RPM at the turn of a handwheel conveniently placed on the column.

Range of Feeds: Longitudinal, 34"; cross, 8"; vertical, 18"; work surface of table, 27" x 8".



SIMMONS LATHES provide more spindle speed changes than it is possible to obtain in any geared-head lathe now manufactured. Any speed between the high and low limit is obtainable by operating a handwheel conveniently placed on the front of the machine. In all other respects, the Simmons Lathes are of conventional design and include Timken Precision Tapered Roller Bearings, snap levers for apron feeds and added efficiency under heavy loads.

Simmons Lathes are manufactured in 16" and 18" standard; 18" and 20" heavy (illustrated above) and in a wide variety of gap bed sizes in all bed lengths.

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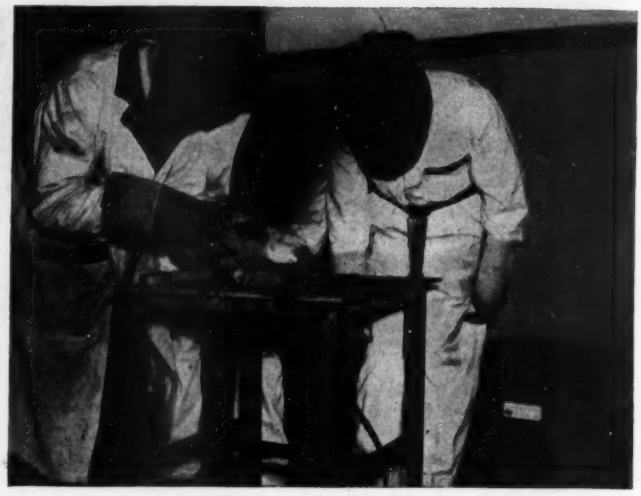

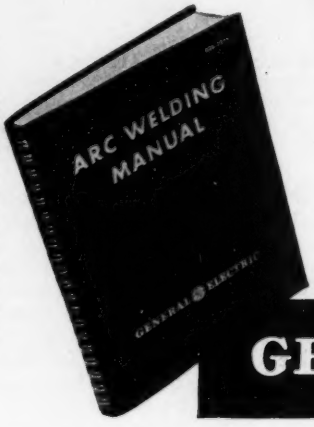

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A New Approach to Driver Education

A booklet full of meaty suggestions obtainable from the National Conservation Bureau, Education Division, New York City.

The Fields of Personnel Work

By Darley and Berdie. This is Occupational Monograph No. 20, issued by the Science Research Associates, 1700 Prairie Ave., Chicago, Ill.

Opportunities in Farming

By Paul W. Chapman. This is Occupational Monograph No. 18, issued by the Science Research Associates, 1700 Prairie Ave., Chicago, Ill.

Industrial and Vocational Education and Art Number

The Educational Leader, Kansas State Teachers College, Pittsburgh, Kans.

This number contains seven excellent thought-provoking articles. Among the writers are such well-known names as, Wm. T. Bawden, Ernest W. Baxter, LeRoy Brewington, and Otto A. Hankammer.

PERSONAL NEWS

DOCTORAL DEGREE CONFERRED ON WILLIAM J. MICHEELS

William J. Micheels, head of the industrial-arts department in the university high school, University of Minnesota, has completed all requirements for the doctor of philosophy degree and received this award in June, 1941. His doctor's dissertation reported a nation-wide study of the "State Supervision of Industrial Arts."

Mr. Micheels was graduated from the Stout Institute in 1932 and received the master of arts degree at Minnesota in 1938. He had served as teacher of industrial arts and had been co-ordinator of part-time cooperative classes prior to his campus service.

Dr. William Micheels

The past five years have been spent under a teaching schedule including the university high school and the department of industrial education. In the latter connection he has presented both graduate and undergraduate courses in addition to acting as critic of practice teaching.

During the summer of 1941 he was at Utah State College, Logan, Utah, supervising the preparation of a Course of Study in Industrial Arts for that state.

Mr. Micheels has spent three summers in Europe, has served as president of Eta Chapter, Phi Delta Kappa, and has been active in a campus integration project. Whether he will remain at Minnesota or accept a position elsewhere has not been definitely determined, according to Dr. Homer J. Smith, his major adviser.

ROY R. VAN DUZEE APPOINTED DIRECTOR

Roy R. Van Duzee, supervisor of industrial arts in the public schools of West Allis, Wis., for the past 18 years, was appointed to the position of director of vocational and adult education of West Allis, to take the place of Harry S. Belman, resigned, who has been named Wisconsin field agent for the national defense vocational-education program.

Mr. Van Duzee received his bachelor's degree from the Stout Institute, and his master's from the University of Wisconsin.

He has had practical experience as a carpenter and has had experience as a Smith-Hughes vocational teacher at Minot, N. Dak., and has supervised adult evening work in the West Allis Vocational and Adult Education School for several years.

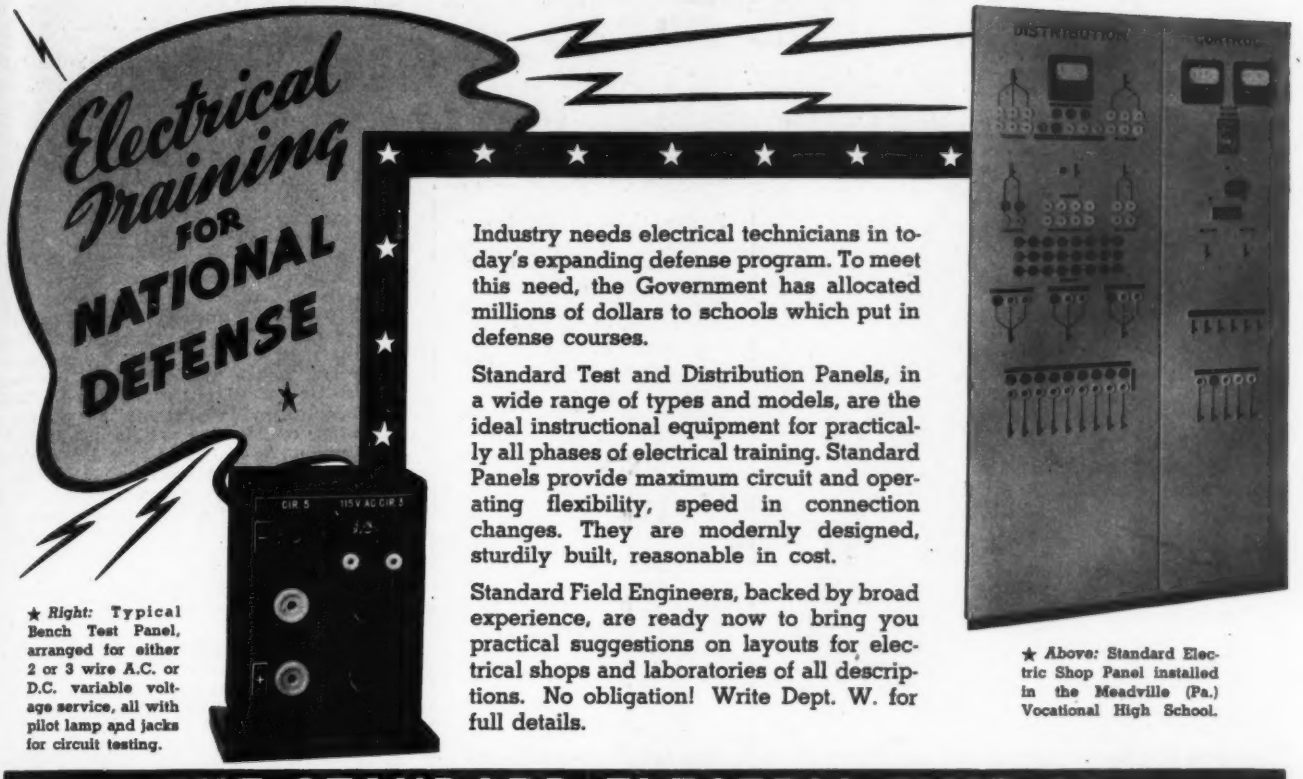
Mr. Van Duzee has contributed much valuable material on tests and measurements, departmental maintenance, equipment planning and accounting, and budget making in the professional magazines of his field.

West Allis is to be sincerely congratulated on having obtained the services of such an able man for the directorship of its vocational school.

WALLACE NUTTING DIES

Dr. Wallace Nutting, retired clergyman, widely known author, illustrator, antiquarian, and manufacturer of reproductions of colonial furniture, died on July 19, 1941, at his home at Framingham, Mass.

(Continued on page 31A)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★ Right: Typical Bench Test Panel, arranged for either 2 or 3 wire A.C. or D.C. variable voltage service, all with pilot lamp and jacks for circuit testing.
★ Above: Standard Electric Shop Panel installed in the Meadville (Pa.) Vocational High School.
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Springfield, Mass. — Branch Offices In Principal Cities

(Continued from page 28A)

Born in Marlboro, Mass., Nov. 17, 1861, he studied at Harvard and the Union Theological seminary. He was ordained to the Congregational ministry in 1888.

Ill-health, however, prompted him to resign to seek outdoor activities. The "Wallace Nutting Pictures," delicately tinted sketches of old New England homes, were the outcome of his first attempts to establish himself after leaving the ministry. Out of this effort followed his love for the beautiful pieces of antique furniture found in the old New England homes which he had learned to depict with such a faithful touch.

Out of his love for antiques grew still another activity, when he started a factory at Framingham in which he strove to reproduce colonial furniture so that those who could not buy originals, could nevertheless enjoy the beautiful things which our colonial ancestors had designed. The business prospered for many years and he was nearly 70 before he disposed of it.

He died at the age of 80.

♦ Dr. F. Theodore Struck, who was granted a six months' leave of absence in order to serve as Consultant in Vocational Education, in the U. S. Office of Education, Washington, D. C., has returned to his position as Head of the Department of Industrial Education at the Pennsylvania State College. While in Washington, Dr. Struck filled the position held by Mr. Frank Cushman who is serving as Lt. Commander in the United States Navy. Professor John F. Friese served as Acting Head of the Department of Industrial Education at the Pennsylvania State College in Dr. Struck's absence.

♦ John A. Whitesel, for the past four years a professor of industrial arts education at the Teachers College of Connecticut, has been appointed to a professorship in industrial education at Miami University. During this past summer quarter Dr. Whitesel has been a Visiting Professor of Education at the Ohio State University.

♦ Louis G. Wust received the M.Ed. degree from the Rhode Island College of Education on June 17, 1941. His thesis bore the title: *What the Industrial Arts Can Do for the Mentally Retarded Boy.*

♦ Charles E. Scott, a teacher at Vashon High School, St. Louis, Mo., has been put in charge of Negro guidance in the St. Louis public school system.

♦ Flynn R. Clark, vocational counselor at Southwest High School, St. Louis, Mo., has been chosen to direct the far-reaching guidance program to be instituted in the public schools of St. Louis at the opening of school in September.

ASSOCIATION NEWS

AMERICAN INDUSTRIAL ARTS ASSOCIATION CONVENTION

An unusually interesting and significant series of six sessions and a continuous exhibition comprised the programs of the American Industrial-Arts Association in Boston, Mass., during the National Education Association convention on Sunday, Monday, Tuesday, and Wednesday, June 29–July 2, 1941.

The association released three valuable publications for the Boston meetings. These included an 8-page program, a 20-page *Directory of Industrial Arts Teacher Education Programs and Personnel in the United States,* and a 16-page reprint of an important address by Dr. William E. Warner entitled, "Bottlenecks: Political, Industrial, and Educational," which was given before the North Central Association of Colleges and Secondary Schools in Chicago, Ill., on March 28, 1941.

The exhibition of adult handicrafts gathered from all parts of New England was held throughout the convention in the showrooms of the Boston Society of Arts and Crafts, where Mr. Humphrey J. Emery, director of the Society, and Mrs. Eva Whiting White, of the Women's Educational and Industrial Union of Boston, cooperated in presenting an important yet much neglected phase of the total program of industrial-arts education.

The meetings opened on Sunday afternoon with a preliminary conference concerning the establishment and the work of the Liaison and Advisory Board of the Association. This board is composed of representative leaders from education, labor, industry, business, government, and the museum, who advise concerning the policies and programs of the association.

The second session was a luncheon sponsored by the New England Industrial Arts Association, at which the president of the association, Mr. Romeo E. Collin, of the Barstow Memorial School of Chittenden, Vermont, presided. Dr. William E. Warner of the Ohio State University, Columbus, and retiring president of the association, spoke on "The Evolving Pattern of our Profession." Professor John J. Hatch of the State Teachers College at Newark, N. J., and executive secretary and treasurer of the association, presented several certificates of affiliation and complimented the men on the fact that nine of the eleven associations for industrial-arts teachers in New England are now affiliates of A.I.A.A.

The third session was a cooperative or joint meeting with the Department of Secondary Teachers of the N. E. A. and was devoted to the ever interesting subject of "Trends." Dean Willis B. Anthony, chairman of the Department of Industrial-Arts Teacher Education in the State Teachers College at Fitchburg, Mass., presided. Each of the three addresses which followed was illustrated. The first was by Edward C. Emerson, director of Industrial Arts, Board of Education, Boston, who spoke on "The Development of In-

(Contnueid on page 32A)

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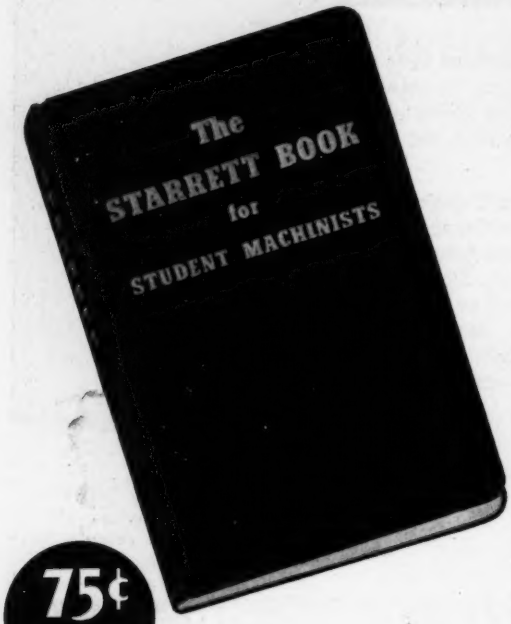
AN UP-TO-THE-MINUTE MANUAL OF MODERN SHOP PRACTICE



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(Continued from page 31A)

dustrial Arts in Boston: an Historical Sketch." Dr. Louis V. Newkirk, director of the Division of Industrial Arts Education, Board of Education, Chicago, Ill., next spoke on "Experimental Developments of Industrial Arts in Junior and Senior High School Programs in the Middle West." This was followed by a presentation from Dr. Herber A. Sotzin, chairman of the Department of Industrial Arts Teacher Education in the State College at San Jose, Calif., who spoke on "Experimental Developments of Industrial Arts in Junior and Senior High School Programs on the West Coast." Mr. Everett J. McIntosh, state N. E. A. director for Massachusetts, summarized the addresses.

The banquet session was sponsored by Epsilon Chapter of Epsilon Pi Tau and held in the University Club. It proved to be another unusually stimulating affair, principally because of the personalities present and the various opinions expressed concerning the place of both industrial-arts and industrial-vocational education in the schools. Professor James J. Hammond, of the State Teachers College at Fitchburg, Mass., opened the meeting as chairman and introduced Superintendent of Schools, Julius E. Warren, of Newton, Mass., as toastmaster. Each of the following then spoke briefly by way of greeting: Dr. Charles M. Herlihy, president of the State Teachers College at Fitchburg, Mass.; Mr. Humphrey J. Emery, director of the Boston Society of Arts and Crafts; Dr. Robert O. Small, state director of vocational education, Boston, and retiring president of the American Vocational Association; Dr. Louis V. Newkirk, Chicago, and president-elect of the American Industrial Arts Association; Mr. John Woodman Higgins, president and treasurer of the Pressed Steel Corporation, Worcester, Mass.; Dr. Louis A. Pechstein, dean of the College of Education, University of Cincinnati; and Dr. William E. Warner, national secretary of Epsilon Pi Tau.

Dr. Francis T. Spaulding, dean of the Graduate School of Education, Harvard University, and distinguished critic of American secondary education, then gave the address of the evening: "The Role of Industrial Arts in the Program of General Education." His conception of industrial arts as being limited to teaching the "feel of tools" through activities devoted principally "to construction and to repair," was ably and consistently argued. The address brought quite a reaction from the group; so much so that it is hoped Dean Spaulding will some time soon give the profession an opportunity to examine his viewpoint in detail, after which appropriate discussions can be held concerning what should motivate and characterize the ultimate program.

The fifth session was a luncheon conference on Tuesday for officers, national and affiliate, of the American Industrial Arts Association, at which time consideration was given to plans for the American Association of School Administrators convention in San Francisco next February, when Dr. Heber A. Sotzin of San Jose, Calif., will have charge of the industrial-arts programs, and for the National Education Association meetings in Denver next June, when Mr. R. L. Schwanzle, regional NYA shop supervisor with headquarters in Denver, will have charge of the programs of the American Industrial Arts Association.

The sixth and concluding session was a symposium on adult handicraft programs, held in the rooms of the Boston Society of Arts and Crafts. Mrs. Eva Whiting White presided. Miss Helen E. Cleaves, of the Board of Education in Boston, discussed "The Preliminary Education of the Craftsman." This was followed by Mr. David R. Campbell, director of the New Hampshire League of Arts and Crafts at Concord, who spoke on "The Relationship of the Local Environment." Professor Royal Bailey Farnum, executive vice-president of the Rhode Island School of Design at Providence, next presented "The Relationship of Crafts to Industrial Design." This was followed by Mr. Frank Staples, handicrafts director of the National Recreation Association with offices in New York City, who spoke on "The Relationship between Handicrafts and Mass Production." Mr. Humphrey J. Emery of the Boston Society then concluded the address with an able presentation on "The Problem of Marketing." Dr. Frederick J. Moffitt, director of public relations for the New York State Teachers Association with offices in Albany, summarized and concluded the meeting.

The association, now incorporated, has been voted departmental status in the N. E. A. and invites active or associate memberships at $1; regular-session student memberships at 50 cents; life memberships at $25; and annual sustaining memberships at from $10 to $100. Its executive offices are at 185 Broadway, Newark, N. J.

♦ An Epsilon Pi Tau fellowship banquet was held on June 30, 1941, at The University Club, Boston, Mass.

The chairman at this banquet was James J. Hammond, sponsor, Epsilon Chapter, Fitchburg, and Julius E. Warren, superintendent of schools, Newton, acted as toastmaster.

Greetings were extended by: Charles M. Herlihy, president, State Teachers College, Fitchburg; Humphrey J. Emery, director, the Society of Arts and Crafts, Boston; Robert O. Small, State Director of Vocational Education, Boston; Louis V. Newkirk, director of industrial arts, board of education, Chicago, and president of the American Industrial Arts Association; John Woodman Higgins, president and treasurer, Pressed Steel Corporation, Worcester; and William E. Warner, National Secretary of Epsilon Pi Tau.

Francis Trow Spaulding, A.M., Ed.D., dean, Graduate School of Education, Harvard University, Cambridge, Mass., gave an address on "The

(Continued on page 34A)

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***No. P-613*. Mechanical Drawing Table 36" x 24" x 34" high.**

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(Continued from page 32A)

Role of Industrial Arts in the Program of General Education."

After the banquet a reception was held in the fraternity's headquarters.

♦ Epsilon Pi Tau, the national honorary professional fraternity in industrial-arts and industrial-vocational education installed a new (Chi) chapter at the Morrison Hotel on May 17, 1941, at Chicago, Ill.

The installation program took place at 5 p.m. At the banquet which was held at 6:30 p.m., Dr. William E. Warner, executive secretary, Epsilon Pi Tau, Ohio State University, was chairman. Dr. Karl L. Adams, president, Northern Illinois State Teachers College, De Kalb, Ill., acted as toastmaster, and Dr. Louis V. Newkirk, director of industrial-arts education, Chicago public schools, introduced the guests present.

A symposium on industrial-arts and industrial-vocational education in times of emergency was then held. The speakers were: Clyde A. Bowman, dean, department of industrial education, the Stout Institute, Menomonie, Wis.; Ernest O. Melby, dean, college of education, Northwestern University, Evanston, Ill.; Paul B. Jacobsen, principal, University High School, University of Chicago, Chicago, Ill.; John J. Metz, editor, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Milwaukee, Wis.; Henry T. Heald, president, Illinois Institute of Technology, Chicago, Ill.; and John A. Bartky, president, Chicago Teachers College, Chicago, Ill.

Dr. William E. Warner then made the charter presentation and John A. Bartky, president, Chicago Teachers College made the response.

Dr. William H. Johnson presented the keys and Coleman Hewitt, co-sponsor, industrial-arts

(Continued on page 36A)

Installation of Chi chapter of the Epsilon Pi Tau Fraternity, Chicago, Ill.

Portion of typical modern school washroom. As many as10 students may wash at each Bradley Washfountain simultaneously.

BETTER WASH FIXTURES

Encourage Cleanliness... Guard Health

● Group wash fixtures are now installed in a large majority of modern school, college and institution buildings to provide more adequate washing facilities, improved sanitation, and to safeguard health.

Bradley Washfountains are group fixtures serving 8 to 10 students simultaneously, each with his own clean spray of running water. Being self-flushing no water collects in the roomy bowl, thus this source of contamination and skin affections is eliminated.

With Bradleys ample water is supplied, yet records show that water consumption is 70% less than where single-person wash basins are installed. Piping connections are also reduced 80 to 90%, simplifying installation and maintenance.

Bradley Washroom Consultants offer their services to you and your architects, and our catalog 4010 will be mailed on request. BRADLEY WASHFOUNTAIN COMPANY, 2269 West Michigan St., Milwaukee, Wisconsin.

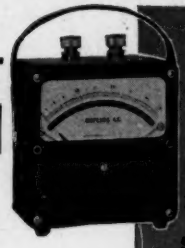
BRADLEY
WASHFOUNTAINS
and MULTI-STALL SHOWERS

Above: This Bradle
near entrance to sch

Above: Wall-type Washfountains (semi-circular) are made in 36-inch and 54-inch diameter suitable for narrow rooms.

Another Bradley Product, the "5-in-a-Group" Shower. Self-contained, sanitary, safe. One set of piping connections serves all 5 stalls.

FOR INSTRUCTION, TOO... *Industry's Test Instruments*
COST LESS... BECAUSE OF THEIR LONG-LIFE DEPENDABILITY!



WESTON
MODEL 430
AC AND DC
INSTRUMENTS

Ideally suited for classroom instruction and student use because of their dependability, ruggedness and relatively low cost . . . features which have made the Model 430 line so universally preferred throughout industry. Have hand calibrated mirror scales of long length, with large scale openings. Accuracy within ½ of 1%. Sturdy Bakelite cases give added protection in service. Extremely compact. Available in complete line of AC and DC instruments.

RELAYS
Sensitive and Power Uses
Current and Voltage Types
SERVICE EQUIPMENT
Tubecheckers, Analyzers, Oscillators
Ohmmeters, Vacuum Tube Voltmeters
LIGHT MEASURING DEVICES
Illumination Meter, Foot Candle Meters,
Sight Meter, Exposure Meters
SPECIALIZED TESTING EQUIPMENT
Power Analyzer, Photoelectric Potentiometer,
Battery Testing Instruments
PANEL MOUNTING INSTRUMENTS
Ammeters, Voltmeters, Wattmeters, Galvanometers
Microammeters, Ohmmeters, Microfarad Meters
INSTRUMENT TRANSFORMERS
Portable and Switchboard — Potential and Current
PORTABLE INDICATING INSTRUMENTS
Ammeters, Voltmeters, Wattmeters, Galvanometers
Microammeters, Ohmmeters, Microfarad Meters
LABORATORY STANDARDS
Voltmeters, Ammeters, Wattmeters
STANDARD CELLS

WESTON
MODEL 772
MULTI-RANGE
MULTI-PURPOSE
CIRCUIT TESTER

One of many WESTON multi-purpose instruments for limited budgets; or for radio training. The Model 772 has 24 voltage, current, resistance and decibel ranges in one instrument. Has large, dependable WESTON 50 microampere meter. AC sensitivity 20,000 ohms per volt. Ohmmeter entirely battery operated. Broad measurements, and low cost, make it ideal for all preliminary checking . . . as well as for radio instruction.

WESTON ELECTRICAL INSTRUMENT CORPORATION
595 Frelinghuysen Avenue, Newark, N. J.

(Continued from page 34A)

department, Chicago Teachers College, presented the charter members, Charles Scott, president, Chi Chapter, Chicago Teachers College, making the student response.

♦ At the Newark State Teachers College, Epsilon Pi Tau initiation (Omicron Chapter) held at Chatham, N. J., on May 24, 1941, the following were initiated into the fraternity:

Joseph B. Ambrosia, Edward J. Ambry, Donald E. Beers, Victor P. Bohsen, M. Stanley Buchner, William M. Devonald, Thaddeus S. Gabry, Donald P. Hoagland, John J. Schmidt, Jr., Rheinhardt W. Siderits, Melvin R. Whiting, William D. Young. Earl W. Butler, president, Omicron Chapter, was the toastmaster at the dinner meeting which followed.

The speakers on this occasion were Arthur von der Linden, Charles Jochem, Neil Flanagan, Earl Butler, *past presidents*, of Omicron Chapter.

♦ Mu Sigma Pi fraternity of Wayne University, Detroit, Mich., has definitely committed itself to actively sponsor the Future Craftsmen of America program. In furthering this policy, a dinner was arranged for Dr. Paul Cressman, the father of the Future Craftsmen's movement, on May 1, at which student representatives of the various clubs, club sponsors, and interested teachers met to discuss how to make this worth-while work still more efficient.

Initiates at the Epsilon Pi Tau Omicron chapter initiation, Newark State Teachers College, Newark, N. J.

♦ The Industrial and Educational Counselors Association, which is the Milwaukee Branch of the National Vocational Guidance Association, met at a dinner meeting on May 15, at the Boy's Technical High School, Milwaukee, Wis.

After the dinner, R. A. Beckwith, chief engineer of the Koehring Co., spoke on the "Cooperation of Industrialists and Educational Counselors," and Elmer Ellis, Counselor of the Boys' Technical High School, discussed "How the Trade and Technical High School Curriculum Is Assisting in the Defense Program." After the meeting, the visitors were given an opportunity to see the school shops in action.

The officers of The Industrial and Educational Counselors are R. A. Beckwith, president; F. W. Ziegenhagen, vice-president; A. J. Scholter, secretary; and W. L. Brauer, treasurer.

♦ The School Crafts Club of New York City held its April meeting at the Hotel Imperial, New York City, April 26, 1941.

Mr. Johnson of New York University was the guest speaker and his topic was "Industrial Arts As Practiced Throughout New York State." He outlined the industrial-arts courses of study as used in schools outside the metropolitan area. They have an organization known as the "steering committee" or "clearinghouse" which convenes twice yearly. The clearinghouse provides an opportunity for guilds or clubs of the various communities to send delegates to the conventions where views are exchanged in connection with courses of study and teaching problems.

The annual banquet and 200th meeting of the School Crafts Club was held at the Hotel Imperial on Saturday, May 17, at 6:30 p.m.

♦ The Sixth Annual Banquet of the Westchester Industrial Arts Club took place at Mayer's Park-

(Continued on page 39A)

A Valuable Service TO INSTRUCTORS

Send now for a set of these STANLEY WALL CARDS—visual teaching aids showing the correct use and care of common woodworking tools.

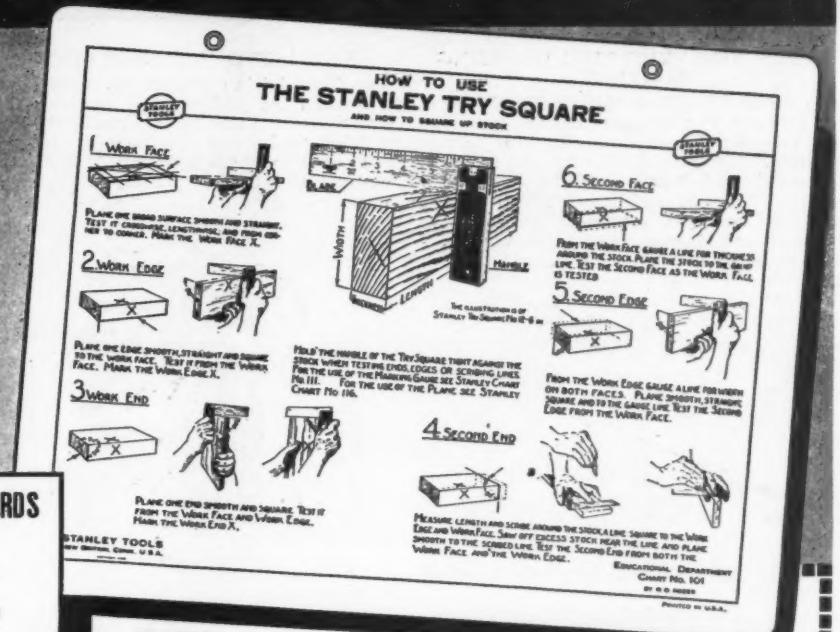
They make instruction easier, simplify the task of preparing assignments, save long detailed explanations.

A set consists of 16 cards, printed both sides—32 subjects. Printed on extra heavy cardboard, protected with coating of clear lacquer. Easily cleaned; permanent. Hooks for easy hanging are supplied.

Offered at our cost of printing and postage, $1.50 per set, delivered anywhere in the U. S.

STANLEY TOOLS

Educational Dept., New Britain, Conn.



LIST OF SUBJECTS - - STANLEY WALL CARDS

No. C129 Boring Tools	No. C118 Nail Hammer
No. C130 Hand Saws	No. C119 Screw Driver
No. C117 Bit Brace	No. C109 Common Wood Joints
No. C127 Hand Drill	No. C110 Common Wood Joints (Advanced)
No. C102 Doweling Jig	No. C103 Stanley Bailey Planes
No. C128 Spoke Shaves	No. C108 Common Cuts in Wood
No. C125 Butt Gauge	No. C101 Try Square
No. C126 "T" Bevel	No. C111 Marking Gauge
No. C123 Cabinet Scraper	No. C55 Riveting Hammer
No. C124 Hand Scraper	No. C56 Setting Hammer
No. C116 Stanley Plane	No. C53 Flat Cold Chisel
No. C122 Stanley Block Plane	No. C54 Cold Chisels
No. C114 Double Plane Iron	No. C51 Ball Pein Hammer
No. C115 Setting Stanley Plane	No. C52 Straight and Cross Pein Hammers.
No. C112 Grinding Stanley Plane Irons	No. C120 Use of Chisel (Horizontally)
No. C113 Whetting Stanley Plane Irons	No. C121 Use of Chisel (Vertically)

STANLEY
Trade Mark

STANLEY TOOLS
EDUCATIONAL DEPT.
NEW BRITAIN, CONN.

Enclosed find $1.50 (check or money order).
Send a set of Stanley Wall Cards to . . . .

Name .....
(please print plainly)
Address .....
.....

(Continued from page 36A)

way Restaurant, New York City, on May 24, 1941. One hundred and twenty-four members and guests were in attendance.

Emerson W. Manzer, first president of the organization and now its historian, reviewed the past history of the club, which covered a 10-year period. Certificates in recognition of 10 years of continuous and active membership in and service to the organization were presented to Paul Ansel, George Benn, W. F. Borton, Wallace Burroughs, Harry Clark, Fred Farr, John Faust, Norman Ferguson, George Gordon, George Hermance, Orville Hayford, Roland Hintz, Carl Hubacheck, C. A. Hopkins, Charles Lefferts, Herbert F. Lidstrom, Henry Lacey, Paul Manville, Arthur Northrop, David V. O'Connell, Wilbur Robinson, Ralph Smith, Harry Towers, Leo Tyrrell, Charles Walthers, Frank Wesley.

The following officers were installed for the ensuing year: president, Herbert F. Lidstrom of Rye Neck; vice-president, Norman Ferguson of North Tarrytown; secretary, Oliver Kendall of Mount Vernon; treasurer, Roland Hintz of New Rochelle. After the installation the members and guests present enjoyed bridge, dancing, and good-fellowship.

The committee which had arranged this banquet consisted of Francis DeLaney, chairman, Oliver Kendall, Richard Stottler, Harry Kabel, Orville Hayford.

NEWS NOTES

♦ The Civil Service Commission announced an examination to secure economists in all branches of economics for government service. The positions to be filled pay from $2,600 to $5,600 a year. Applications will be accepted at the commission's Washington office until further notice and will be rated as soon as practicable after receipt. Persons who filed applications for the general economist examination announced in September, 1940, and who received eligible ratings need not file another application. Their eligibility will be continued. However, if they wish to apply for a higher position than that in which they were rated eligible previously, they should file a new application.

Economists will be appointed in various government agencies to conduct professional research in one or more branches of economics and to maintain working relationships with federal and state agencies. This will include the collection, compilation, analysis, and interpretation of data and its preparation for further use or publication. This work will involve supervision of clerical and professional employees of lower grades.

In addition to completing a four-year college course in economics, persons must have had professional experience in economic research or in responsible college teaching in economics which was accomplished by research, provided that a portion of the experience was in a specialized branch of economics. Provision is made for the substitution of graduate study and college teaching in economics for some of the experience. However, any college teaching offered to fulfill the requirements must have been full-time and subject only to general supervision.

Persons who are interested may obtain further information and application forms at any first- or second-class post office or from the Civil Service Commission in Washington.

♦ The Hobart Trade School Inc., was opened to students in April by Hobart Brothers, Troy, Ohio. With facilities for training 80 students in arc welding, the school already had a full registry for its first few weeks of operation. The trade school is a nonprofit organization established for the purpose of bettering the welding profession by sending trained and qualified men into the field.

The main course of study offered in the school consists of 160 hours of training thoroughly covering the metallic arc with both plain and coated electrodes. For advanced students or for experienced steel welders, additional special courses by personal instruction are provided in welding nonferrous metals or special alloys.

Each student has the private use of an individual welding booth equipped with welding bench and machine. An arc-welded ventilation system separately connects each of the school's 50 welding booths. Ventilation may be regulated by each student in his booth according to his desires. A work chart is kept by each student in his booth showing his progress and also the size metal, electrode, and welding heat used for every lesson.

♦ Fifteen thousand employees of U. S. Steel Subsidiaries, are undergoing intensive training for skilled jobs.

This training fits the employee for the next higher job in regular mill operations.

♦ Practical training in driving Dodge army trucks in rough going on a specially constructed testing-ground adjoining the Dodge truck plant in Detroit forms the spectacular and exciting part of a training course for officers of the Motor Transport and Quartermaster Corps now being conducted by the Chrysler Corporation.

Each week 30 commissioned officers from cantonments throughout the country attend the school. Each Wednesday afternoon is devoted to a driving field day for the Army men. The officers take turns driving the reconnaissance cars, command cars, weapon carriers, troop transports, cargo transports and ambulances over precipitous grades of 60 per cent and more, through a veritable mud wallow in which the wheels of the trucks drop practically out of sight, over rutted fields, bogs and through second-growth brush.

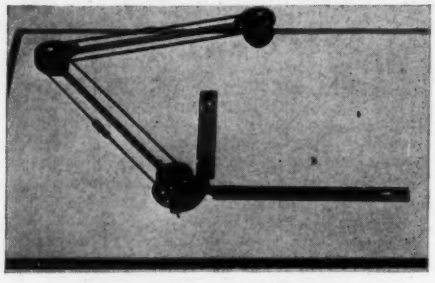
The Chrysler Corporation Army School is in charge of J. G. Gauthier, special service

(Continued on page 47A)

SHOP EQUIPMENT NEWS
New Products—Publications

POST'S NEW TRUE LINE DRAFTING MACHINE

In the new Post True Line Drafting Machine, the Frederick Post Company has the answer to the draftsman's problems. Built to hairline accuracy, this machine embodies the following instruments used to make a drawing — protractor, vernier, T square, scales, and triangles. It is easily and conveniently operated and eliminates smudging and blurring caused by moving instruments over the drawing.



True line drafting machine

The new Post True Line machines are equipped with "Quick Flick" controls. A flick of the thumb from its natural position, and the scales are released for 15 degrees automatic stops, or for intermediate stops and locking. All with one simple positive control. So easy that the left thumb (right thumb on left-handed machines) is all that is required, leaving the other hand free.

Again, a flick of the same thumb and the scale can be set at any angle with a protractor and vernier reading of zero to zero. No more adding and subtracting when engrossed in detail around a focal point in the drawing. The protractor and vernier does it for you.

In all Post True Line Drafting Machines the design permits the use of the instrument with the elbow to the left or right. The protractor may be used at any angle in the complete circle, so that the total area of the board is made accessible.

With fewer working parts, the Post True Line Machine is keeping abreast of the times in design simplicity. Its hardened-steel construction gives greater accuracy with time- and moneysaving features. All parts subject to wear are made of hardened steel, not dural which may chip. The index plate subject to the greatest wear is notched so it will take up any wear automatically.

STRIKING-FACE BOX "SUPERRENCH"

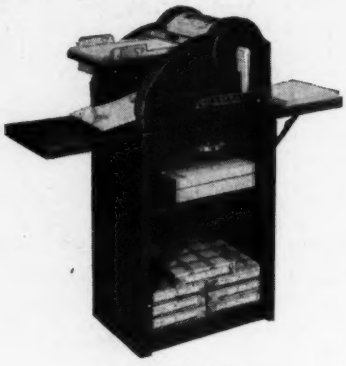
The J. H. Williams and Co., 225 Lafayette St., New York City, have just placed a line of "Superrenches" on the market which are particularly adapted for heavy work in close quarters where large nuts must be set up tight, or "frozen" nuts loosened.

New striking-face Superrench

These wrenches are available in 10 sizes for nuts from 5/16 to 1¾ in. They are drop-forged from chrome-molybdenum steel, properly heat-treated to withstand shock loads, and they are finished in baked, gray enamel over all.

NEW DITTO "R-5" DUPLICATOR

Producing bright copies quickly, at only 5 cents a hundred, and without using type, stencil, or ink, the new Ditto "R–5" gelatin duplicator promises to become even more popular than previous Ditto school duplicators. It was designed especially to handle the pressing new needs arising in education.



R-5 duplicator

On the new "R–5," any typed, written, or drawn original can be duplicated on sheets measuring 3 by 7 to 8½ by 14 in.; using from one to eight colors, at the rate of 70 copies a minute. Any bright 12-year-old can operate the machine.

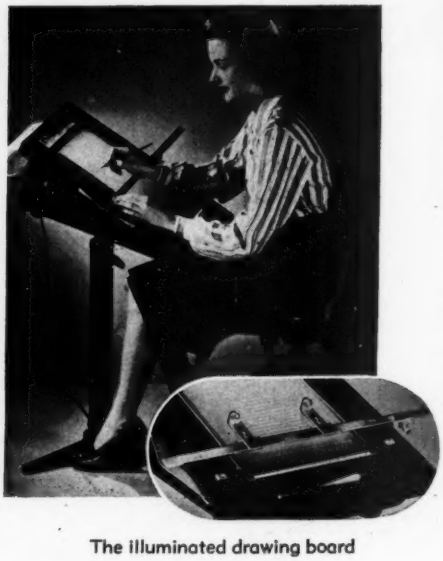
The "R–5" is very versatile and may be used for duplicating classwork sheets, school newspapers and posters, notices, lectures, outlines, maps, forms, data, music scores, and the like. Helpful free idea literature is offered by the makers, Ditto, Inc., Harrison & Oakley Blvd., Chicago.

MIMEOGRAPH ILLUMINATED DRAWING BOARD

The A. B. Dick Company, Chicago, Ill., has recently produced a new Mimeograph illuminated drawing board whose outstanding feature is its remarkable maneuverability. Capable of instant adjustment, this new Mimeograph accessory may be positioned at any angle required for easy, speedy, stencil illustration work.

It is a floor model which stands firmly on a three-point base. The glass top is set in a wide smooth one-piece unbroken surface of molded plastic. This provides easy and precise control of the T square when used either the long or the short way. New and unique are the "line stops" which greatly facilitate accurate and uniform lines for ruled formwork. A convenient light switch actuates unusually even distribution of illumination and at the bottom of the table is an especially designed receptacle to hold Mimeograph styli and drawing instruments.

The new Mimeograph illuminated drawing board, Model 10, is both lightweight and sturdy; its attractive design and finish harmonize with all current Mimeograph duplicator models.



The illuminated drawing board

"HOLD-HEET" GLUEPOTS

"Hold-Heet" gluepots, a product of the Russell Electric Co., 364 W. Huron St., Chicago, are now being manufactured in strict accordance with U. S. Navy specifications.

The gluepots are now available with special copper covers at a small extra cost. The appliance cord has been lengthened to 8 ft., and the rating of the element is now 115 volts and 230 volts.

Outstanding features embodied in these gluepots are the automatic thermostatic control which keeps glue temperature controlled accurately within 1 deg. of proper temperature; double asbestos insulation which saves current; elimination of water jackets and their attendant trouble; safe operation — listed by Underwriters'; the famous "20-year" heating element built for even, uniform heating; nickel-plated container that can't discolor glue; and a heavy welded steel-plate body that is "built like a boiler."

Complete descriptive data covering all "Hold-Heet" gluepots is available on request by writing the Russell Electric Co., 364 W. Huron St., Chicago.

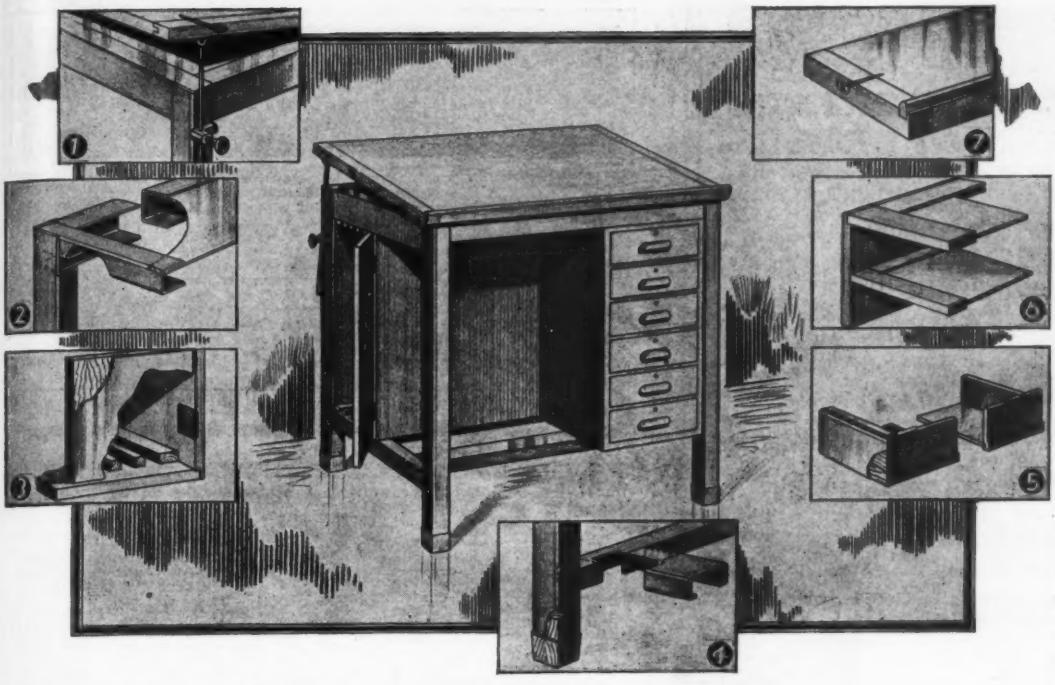
FREE PROJECT PORTFOLIOS

As a service to industrial-arts teachers who are looking for worth-while and useful projects for their students, International Cellucotton Products Co. has prepared two portfolios, each of which will present a number of attractive, well-designed plans for making Kleenex dispensers. Portfolio 1 is designed for elementary levels and Portfolio 2

for secondary levels. Each of these will contain six designs. They will be ready for distribution shortly. The designs are on instruction sheets of which the cut shown herewith is a much reduced copy. These instruction sheets, 8½ by 11 in. in size, contain a clear working drawing, a bill of materials, and explicit directions for constructing and finishing the project.

The finished Kleenex dispenser will be much prized for the mother or sister who is fortunate enough to get one. For further information address Kleenex Project service, 919 North Michigan Ave., Chicago, Ill.

(Continued on page 43A)



The New Lifetime Drawing Table

This new type of drawing table originated by Hamilton is made of both steel and wood. This construction insures strength, rigidity and long life, even under continuous school use. It is truly a lifetime table. Notice the seven features illustrated at the left.

Send in the coupon for a complete catalog of laboratory and vocational furniture describing in detail lifetime features of Hamilton Drawing Tables.

Hamilton Mfg. Co.
Two Rivers Wisconsin

HAMILTON
Laboratory and Vocational Furniture

HAMILTON MANUFACTURING CO. IA-9-41
Two Rivers, Wis.
Please send me your new Laboratory and Vocational Furniture Catalog.
Name .....
School and Position .....
Address .....
City and State .....

(Continued from page 40A)

FREE TEST ON NEW DRY DEVELOPER PAPER

Owners and users of White Print dry developer or Ammonia Vapor machines are cooperating with Frederick Post Co., Chicago, manufacturer of sensitized papers, in final tests on the new "VAPOpaper" blue-line paper.

Among the improvements are: 50 per cent rag content bond against sulphite stock used in existing papers: two "speeds" in sensitivity — regular and fast; two colors — deep royal blue and "Post" red.

The new sensitizing medium is said to print out to a cleaner, whiter background and at the same time leaves all lines in deeply colored contrast. Special emphasis is placed on the crisp detail of fine lines.

To owners of Ammonia Vapor machines, who care to cooperate in the "field trial" test under "on the job" conditions, Frederick Post is delivering a $2.50 stock of "VAPOpaper" free, asking only a brief report on its performance in return. Owners of these dry developer machines may secure a free trial stock of "VAPOpaper" by sending the model or serial number of their machine with their request to The Frederick Post Co., Box 803, Chicago.

HANDBOOK ON CONTOUR SAWING

Of particular interest to DOALL operators, vocational teachers, NYA officials and trainees, is the New Contour Sawing Handbook published by Continental Machines, Inc., Minneapolis, Minn.

This handbook contains complete information on the art of contour sawing and its application. Its great acceptance as the fastest precision method of removing metal has caused a shortage in trained operators.

The handbook will greatly assist the training of such operators, as well as being a reference guide to application.

The handbook contains 158 pages devoted to illustrations and guide charts covering all phases of contour sawing and filing of metals to any desired shape. Contour sawing in comparison with other machining processes such as the shaper, nibbler, lathe, miller, and torch cutting is made in the first section of the handbook. Section two illustrates application and work accomplished by contour sawing. Section three gives a short résumé of machine tools and their direct effect on our standard of living.

The book is bound, indexed, and covered in textbook style with an added feature which permits the pages to lie flat at any opening.

The handbook is free. All requests should be directed to Continental Machines, Inc., Minneapolis, Minn.

NEW CATALOG

E. H. Sheldon and Co., Muskegon, Mich., has recently issued a shop-bench and drafting-table section of its laboratory furniture catalog No. 25.

This catalog describes wood and metal benches with type A and B legs, or with drawer or cabinet sections or combinations of the two for use in general shops, plumbing and sheet-metal shops, machine shops, electrical shops, and drafting rooms.

Several pages of the catalog are devoted to a description of woodworkers' vises, machinist and pipe vises, table stops and clamps.

The Sheldon planning service is also described and a number of school-shop layouts are shown.

MULTIPLE SPOT WELDER

The Eisler Engineering Co. of 740–770 So. 13th St., Newark, N. J., has recently placed the illustrated multiple spot welder on the market. With this welder a large number of multiple spot-welding setups are possible. Adjustments can be made to make circular, straight, square, rectangular, or any odd shape welds, to conform with any need. From 2 to 12 spots can be made simultaneously, depending on the nature of the job. These machines are primarily intended for the spot-welding of light sheet-metal work where a large range of adjustments for various spots and shapes are to be considered.

Pressure electrodes are used with suitable air operation equipment. The electrodes have an individual adjustment so as to maintain an even pressure on all the spot welds being made.

NEW AMACO POTTERY CATALOG

The American Art Clay Co., Indianapolis, Ind., have just issued their new catalog, No. 30, in which are described their Amaco Pottery supplies and equipment.

This catalog presents full information on the Amaco pottery units which come in sizes to accommodate 6 to 8, 12 to 16, 16 to 20, and 20 to 30 students. Each of these units assures the instructor that he gets all that is required, as far as supplies and equipment are concerned, to conduct a successful pottery course for a class of the size for which he has ordered a unit.

Each unit includes an Amaco electric kiln, clays, glazes, tools, miscellaneous supplies, and two non-technical pottery textbooks.

Gas and oil-fired kilns also are illustrated and described, as are also various types of temperature controls, potter's wheels, clays, glazes, stains, colors, slips, chemicals, pyrometric cones, and other needed tools and equipment.

NEW SOUTH BEND 9-IN. LATHE CATALOG

A new illustrated catalog covering South Bend 9-in. Precision Lathes, Models A, B, and C, has recently been announced by the manufacturer.

Two new models of the 9-in. Precision Tool Room Lathe are described in this 56-page catalog, as well as the 26 other types making up the balance of the 9-in. line. Among the uses for these lathes are production operations on precision parts and toolroom work. Each one of these lathes is designed to handle a wide variety of work, and the information given permits the selection of the type that is best suited to the work.

(Continued on page 47A)

WEBER

Est. 1853

DRAWING MATERIALS
ARTISTS' MATERIALS
STUDIO, SCHOOL, and
DRAFTING ROOM FURNITURE

Write for Catalogue Vol. 700

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Patronize Your Nearest WEBER Dealer

All ready for you!
A NEW COURSE IN ELECTRIC ARC WELDING
EQUIPMENT · TEXT · LESSONS

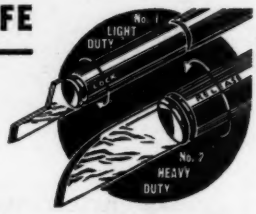
With this training, students can always get profitable employment after graduation. This complete course including equipment, text, lessons, is being used widely in leading NYA courses, YMCA work, Colleges, Trade Schools and Technical High Schools all over the country. Let us tell you how easy and economical it is to maintain an electric arc welding class in your Schools with "Simplified" Arc Welding. We have an "Operators' Training Course" in book form, and another book which shows the hundreds of profitable jobs open in arc welding. Write for these books — we'll gladly send them with our compliments.

Write Today! Hobart Bros. Co., Box IA-91, TROY, OHIO

Have You Seen **X-acto . . .**
the INTERCHANGEABLE KNIFE

X-acto is different than ordinary knives . . . the blade is interchangeable. Handles furnished with 8 varied shapes for various uses. Extra blades attractively priced for economy. Made of surgeons' steel.

Write for catalog and sample offer.



X-acto
Precision Knives with Replaceable Blades

X-acto Crescent Products Co., Inc.
440 - 4th Avenue, New York, N. Y.

Thousands of Industrial Arts Instructors, in all parts of the country, have already received our new 1941 Catalog of

"HARD-TO-GET" MATERIALS

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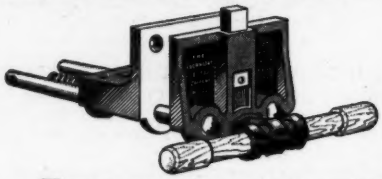

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Write for details.

THE RHODES MFG. CO.
WALTHAM MASSACHUSETTS

(Continued from page 43A)

All attachments, tools, and accessories for use with these lathes are shown.

Copies of this catalog, 50-B, are available from South Bend Lathe Works, 398 East Madison St., South Bend, Ind.

NEW CATALOG NO. 60

The Huther Bros. Saw Mfg. Co., Inc., of Rochester, N. Y., have just issued Catalog No. 60 which describes the many saws and saw-conditioning equipment which they manufacture.

Among the saws illustrated are the solid-tooth circular saws, dado heads and cutters, inserted-tooth groovers, matcher cutters, lock-corner cutters, wedge-joint cutters, formed-tooth grooving saws, shaper cutters, planer knives, concave and chamfering saws, band saws for wood or metal, saw vises and conditioning tools, saw filing machines, saw brazing machine, and brazing compounds and solder.

CATALOG OF CRAFT SUPPLIES

The American Handicrafts Co., 193 William St., New York City, has just issued its 1941–42 catalog of craft supplies in which are listed the tools and supplies needed by handicrafters in leather, metal, beads, felt, ceramics, weaving, and woods.

Supplies for archery, artwork of various kinds, basketry, block printing, crystal craft, glass etching, feltwork, model building, and a number of other crafts subjects also are listed.

This catalog is very complete and very helpful to teachers who are interested in one or a variety of craft subjects.

CATALOG OF GAS APPLIANCES

The Johnson Gas Appliance Co., of Cedar Rapids, Iowa, has just issued a new catalog which pictures and describes their entire line of burners, furnaces, torches, mixers, valves, and blowers. Among the new items shown in the catalog are the Johnson No. 130 hearth-type furnace, the No. 570 pot-type hardening and melting furnace, No. 34 preheating torch, the No. 305 MW bunsen burner which can be mounted parallel with the pot, tank, or vat; the No. 80 slot-type burner for heating large areas, and the automatic air-gas proportioner. Also included is a chart showing correct carburizing and heat-treating temperature and a heat-color chart. The Johnson Co. offers this new catalog free to anyone who requests it.

AN ILLUSTRATED BOOKLET

"Bradley Washfountains and Multi-stall Showers On the Job" is the title of a little booklet recently issued by the Bradley Washfountain Co., Milwaukee, which describes washroom installation for schools, camps, institutions, and the like, in pictures accompanied by brief explanatory legends. Everybody having anything to do with providing modern sanitary washing facilities for groups of people will find this booklet both interesting and instructive. Free copies are available on request.

NEWS NOTES

(Continued from page 39A)

representative. He is assisted by a staff of five experienced and specially qualified corporation maintenance experts.

♦ The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio, has announced the schedule of its Training School for users of spray painting equipment for the past six months of 1941.

The school is open to industrial finishers, painters, automobile refinishers, and other users of DeVilbiss equipment interested in learning the technique of spray painting and the use and care of spray-painting equipment. It will be held at the company's Toledo, Ohio, plant.

Dates for the start of each training period are: September 22, October 20, November 10, and December 15.

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We don't want to be alarmists but the plain facts are these:

The Government has placed defense priorities on many items—such as metals, tools and chemicals—many of which are used in Art, Industrial Art and Vocational Courses. Many of these items are no longer obtainable, others are advancing in price almost daily.

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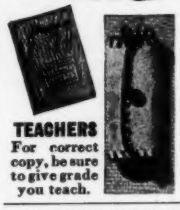

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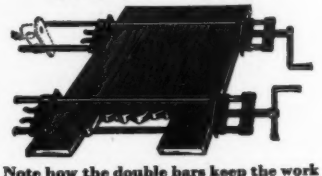

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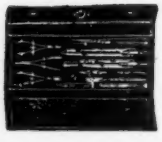

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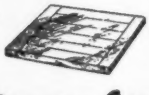

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